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Maladaptive Daydreaming: Proposed Diagnostic Criteria and Their Assessment With a Structured Clinical Interview

Eli Somer
University of Haifa

Nirit Soffer-Dudek
Ben-Gurion University of the Negev

Colin A. Ross
The Colin A. Ross Institute for Psychological Trauma, Richardson, Texas

Naomi Halpern
The Delphi Centre, Apollo Bay, Victoria, Australia

Daydreaming, a common mental activity, can be excessive and accompanied by distress and impaired functioning in daily life. Although currently not formally identified by diagnostic manuals, daydreaming disorder (maladaptive daydreaming [MD]) is a clinically well-defined phenomenon. However, research is lacking regarding the diagnostic reliability of MD. Our aims were (a) to develop diagnostic criteria and a structured interview for MD, (b) to examine the reliability of this measure for distinguishing individuals with and without MD, and (c) to establish an optimal cutoff score for identifying clinical-level MD using an existing self-report measure. Thirty-one individuals who met screening criteria for MD and 31 matched controls completed the self-report measure and participated in 2 structured clinical interviews. Each participant was interviewed independently by 2 clinicians blind to the participant's group membership. Cohen's kappa values for the agreement rate between each interviewer and the screening criterion, and between the 2 interviewers, ranged from good to excellent (κ = .63–.84). A cutoff score of 50 on the self-report measure yielded nearly perfect sensitivity and specificity and good-to-excellent agreement between the self-report measure and the interview (κ = .68–.81). Our interviews were conducted over the Internet, rather than in person; results might have been influenced by self-selection; and interviewing wider samples is warranted. We found that MD can be diagnosed reliably using a structured interview developed for that purpose. The new diagnostic interview showed excellent agreement with a self-report measure for the disorder. Additionally, we identified a useful cutoff score for future self-report research.

Keywords: maladaptive daydreaming, fantasy, absorption, assessment, diagnosis

The scientific literature has regarded daydreaming as a common experience comprising much of normal mental activity (Klinger, 2009; Singer, 1966), with almost half of all human thoughts reflecting daydreaming activity (Killingsworth & Gilbert, 2010). Several everyday behaviors, such as sleeping, eating, engaging in sexual relations, and experiencing normal emotions such as happiness and sadness have psychopathological manifestations (classified in major psychiatric assessment manuals). Yet, the reported commonness of daydreaming can leaves some scholars disinclined to deem extreme daydreaming a mental health issue, even when excessive fantasizing causes dysfunction and distress (Reddy, 2016). Normal daydreaming and mind-wandering have largely been conceptualized as off-task thought (Singer, 1975; Smallwood, Obonsawin, & Heim, 2003) or as undirected thought (Klinger, 1975). Normal daydreaming is usually not particularly fanciful

Eli Somer, School of Social Work, University of Haifa; Nirit Soffer-Dudek, Consciousness and Psychopathology Lab, Department of Psychology, Ben-Gurion University of the Negev; Colin A. Ross, The Colin A. Ross Institute for Psychological Trauma, Richardson, Texas; Naomi Halpern, The Delphi Centre, Apollo Bay, Victoria, Australia.

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Correspondence concerning this article should be addressed to Eli Somer, School of Social Work, University of Haifa, 199 Aba Khoushi Avenue, Haifa 3498838, Israel. E-mail: somer@research.haifa.ac.il

(Klinger & Cox, 1987) and is said to serve four adaptive functions: future planning; creativity and problem solving; attentional cycling that allows individuals to alternate between different information streams to advance important goals; and dishabituation, which improves learning by providing short breaks from external tasks (McMillan, Kaufman, & Singer, 2013; Schooler et al., 2011).

However, recent research suggests that daydreaming can be persistent, difficult to control, time consuming, and dysfunctional. Maladaptive daydreaming (MD) is a fantasy activity that can be described as a behavioral addiction[1] for vivid fanciful imagery that can last for hours, and be triggered or maintained either by evocative music or repetitive physical movement, such as pacing or rocking. Some respondents with MD report that their daydreams involve compensatory narratives featuring idealized versions of themselves. In contrast, others report absorbing soap-opera-like plots involving alternate families or complex inner-worlds featuring sci-fi or medieval backdrops. These fantasies continued for years with characters aging appropriately over time (Bigelsen & Schupak, 2011; Somer, 2002; Somer, Somer, & Jopp, 2016b).

Individuals with MD report immensely gratifying fantasies involving such themes as romance, relationships with celebrities, wish fulfillments, and idealized versions of self (Bigelsen, Lehrfeld, Jopp, & Somer, 2016). MD also encompasses negative reinforcements, such as when emotionally distressed individuals soothe themselves with absorbing compensatory fantasizing (Somer, 2002; Somer, Somer, & Jopp, 2016a).

The addictive nature of MD concerns many maladaptive daydreamers. For example, in a response to open-ended questions regarding why respondents find MD distressful, 25% of participants described this mental activity as a compulsive addiction that engenders irritation, anxiety, and even illness when curbed (Bigelsen & Schupak, 2011). The following comments illustrate their addictive experience: "I can't turn it off. . . . I get a bad conscience; maybe like a drinker who promised himself 'this is the last bottle' and then finds himself back in the old habit."; "If I go a whole day without daydreaming I can actually become sick, as strange as it sounds almost like I am going through withdrawal. I become very anxious, I have intense migraine, and my stomach will hurt" (p. 1644). Somer et al. (2016a) also provided evidence for the insatiable yearning for daydreaming reported by struggling individuals. For example, one respondent stated, "I often need to leave home to get my fix" (p. 474), "Feels like an addiction. I am in control of what drug I want, but not how much I consume it" (p. 475). And finally, in a confirmatory three-correlated-factor model, Somer, Lehrfeld, Bigelsen, and Jopp (2016) found that the craving for MD was a distinct factor of the Maladaptive Daydreaming Scale (MDS).

Bigelsen et al. (2016) recently provided more evidence that MD is an abnormal form of fantasizing. The authors reported that MDers scored higher than non-MDers on measures of dissociative experiences, obsession, and inattention. Recent evidence suggests that MD is also associated with social anxiety (Herscu, 2015) and Internet addiction (Uslu, 2015). Finally, MD can interfere with academic, interpersonal, or vocational functioning. Individuals with MD reported that their excessive daydreaming interfered with their sleep and compromised their relationships, work, and academic performance (Bigelsen & Schupak, 2011). The time and resources invested in MD often produce not only functional impairments but also considerable emotional distress (Bigelsen et al., 2016; Somer, 2002; Somer, Somer, & Jopp, 2016b).

MD appears to be distinct from consciousness constructs described previously in the literature. As noted above, MD differs from normative daydreaming and mind-wandering, because it is characterized by increased richness of fantasy and absorption in imagination. However, it also differs from a closely related trait, fantasy proneness (FP), explained by Wilson and Barber (1981). FP describes individuals who report that they engaged in highly vivid daydreams for as much as half their waking hours. Nevertheless, Wilson and Barber did not characterize FP as a disordered

[1] The DSM refers to two types of addictions: substance addictions (e.g., alcohol, heroin, etc.) and behavioral addictions (e.g., gambling, sex). Because persistent, volitional daydreaming is a (mental, not physical) behavior, MD is referred to in this article as a behavioral addiction.

condition. Lynn and Rhue (1987) reported that a small subset of individuals with FP demonstrated significant concomitant psychopathology, but they provided no information regarding the precise nature of the distress experienced or the maladaptive sequelae of FP-related psychopathology. In addition, key characteristics of FP are belief in parapsychological phenomena and confusion between fantasy and reality (Wilson & Barber, 1981, 1982), which are typically absent in MD (Bigelsen & Schupak, 2011).

Although the scientific literature on MD a term first coined at the beginning of this millennium (Somer, 2002) is sparse, countless Internet users have used this term to describe their condition. A recent Google search of the term *maladaptive daydreaming* yielded 61,900 hits (January 27, 2017), which included articles and discussions on health and psychology websites, Facebook communities in many languages, personal blogs, video testimonies, as well as online communities by and for persons with MD who seek peer support (e.g., the Yahoo Maladaptive Daydreamers Forum [https://groups.yahoo.com/neo/groups/maladaptivedaydreamers/info] with over 3,490 users and the Wild Minds Network [http://wildminds.ning.com] serving over 6,198 participants with MD, both as of January 7, 2017]). Participants in such online communities reported distress associated with difficulty in controlling their urges to daydream, concerns about impairments in important areas of daily function due to extensive time and resources dedicated to fantasizing, as well as shame and efforts to conceal MD behavior, often observable by associated mimicry and gesturing (Bigelsen & Schupak, 2011). Despite evidence that MD was associated with considerable pain and dysfunction (Bigelsen et al., 2016), therapists tended to trivialize the condition, suggesting that it was normal, or had provided care for better known diagnoses that was ineffective in curbing MD (Bigelsen & Schupak, 2011; Somer et al., 2016b).

In-depth interviews with individuals suffering from MD have indicated that, although respondents had attempted to seek help for MD, professionals were unfamiliar with their problem and provided various diagnoses, including depressive disorder, anxiety disorder, obsessive–compulsive disorder, posttraumatic stress disorder, borderline personality disorder, and dissociative disorder, along with their corresponding treatments (Somer, Somer, & Jopp, 2016a). Precise screening, assessment, and diagnosis of the presence and severity of any disorder are essential first steps toward planning adequate therapy. The current study aims to refine the identification of MD, which appears to be an underresearched psychological disorder (Bigelsen et al., 2016).

The usefulness of a diagnostic nosology is related to the reliability of classification criteria and whether these criteria can validly distinguish between normality and pathology as well as among specific disorders (Egger & Emde, 2011). Existing psychiatric diagnostic manuals such as the *Diagnostic and Statistical Manual of Mental Disorders* (fifth edition [*DSM-5*]; American Psychiatric Association, 2013) and the 10th edition of the International Statistical Classification of Diseases (World Health Organization, 1994), have adopted a phenomenology-based, descriptive classification system of mental health disorders that is supported by empirical evidence. The Robins and Guze (1970) model for validating psychiatric disorders advocated the use of evidence-based classifications, an approach that the American Psychiatric Association (2013) ultimately adopted. Researchers (Bigelsen & Schupak, 2011; Somer et al., 2016, 2016b) have already taken significant steps toward adequate clinical description of MD.

The purpose of our study is twofold. First, we sought to examine the validity and reliability of a structured clinical interview for MD that is based on proposed diagnostic criteria for MD (Somer et al., 2016, 2016a). We used scores on the 16-item MDS (MDS-16; Somer et al., 2016) as a validation criterion. Second, because clinical interviews are not always feasible, our second aim was to (a) examine the ability of the MDS to differentiate between individuals seeking online advice and support for self-identified MD and control participants (who do not seek such advice and support) and (b) ascertain an optimal cutoff score that maximizes the sensitivity and specificity of the MDS for identifying MD.

Method

Participants

The research was approved by the Human Research Ethics Committee of the Faculty of Welfare and Health Sciences at the University of Haifa, Israel. Following approval, we contacted individuals 18 years or older who had contacted the first author following their Google search for such terms as *excessive fantasy*, respondents from a prior MD research project who indicated an interest in participating in future MD research efforts, and those of consenting age who answered our call for participants. The call for participants was posted on several online MD communities (e.g., Facebook) and sent out as an email invitation to members of MD listservs (e.g., Yahoo MD Forum). The call described the study and requested interested individuals with MD to recruit a counterpart participant from their location, of the same gender and age who, to the best of their knowledge, did not suffer from MD. We did not rely solely on this lay classification of counterparts. The allocation of participants to the research and the control groups was ultimately based on their responses to an MD screening question (described subsequently). Each group (MD and controls) comprised $n = 31$, including 20 females and 11 males (62 participants in total). The participants' ages ranged from 18 to 60 in the MD group and from 18 to 63 in the control group. A paired-samples t test indicated no differences between the groups in age (MD group $M = 27.84$, $SD = 10.80$, control group $M = 28.68$, $SD = 10.56$), $t(30) = 1.57$, $p > .05$. The 31 pairs who participated were from 15 countries around the world: eight from the United States of America, four from Israel, three from Canada, three from Italy, two from Germany, two from Australia, and single pairs from Belgium, Brazil, Croatia, India, Indonesia, Pakistan, Sri Lanka, Swaziland, and the United Kingdom. We offered no monetary or other incentives to participate in this study.

Materials

The Structured Clinical Interview for Maladaptive Daydreaming (SCIMD): Proposed diagnostic criteria. The evidence-based clinical description of MD reported above provided the basis for a group discourse among the authors. The discussion focused on the necessary and sufficient diagnostic criteria for MD. The first issue we considered was the name of the proposed psychological condition. The appropriate designation for psychopathology in mental health is "disorder." We therefore felt the proper name for the described condition should be daydreaming disorder. However, the term *maladaptive daydreaming* was coined (Somer, 2002) when the phenomenon was first described. Since then, the MD community has adopted the term *MD*, and it is now widely used. This term yielded 94,000 results in a Google search (September 23, 2016). In the proposed diagnostic criteria for MD (see Table 1), we decided to use the customary descriptor of "disorder," but to retain the commonly known name of the disorder in parenthesis, as it is retained throughout this paper. The SCIMD is included in the Appendix.

Existing evidence concerning MD indicated that the phenomenon is based on a trait for vivid, absorptive daydreaming gone awry (Singer, 1966). We therefore determined that, in addition to the general description of the disorder presented in criterion A, the condition of absorption described in Criterion A1 should also be required. Because vivid absorption capacities in and of themselves, are not necessarily a manifestation of psychopathology, we stipulated in Criterion B that another condition required for MD is distress and impairment (see Singer, 1966; World Health Organization, 1994). The third criterion for MD (Criterion C), rules out the possibility that MD is due to the direct effects of substance use or a general medical condition. Criteria A2–A8 were based on research findings described in previous studies (Klinger, 2009; Killingsworth & Gilbert, 2010; Singer, 1966). The criteria allow for variation in the symptomatic profile of MD and are consistent with the polythetic diagnostic criteria commonly used in *DSM-5* (American Psychiatric Association, 2013).

Although Criteria A, A1–A8, B, and C permit a categorical assessment of MD in accordance with the *DSM-5* (American Psychiatric Association, 2013), we added proposed guidelines for a severity specifier as a dimensional assessment of MD, which is also consistent with *DSM-5*. The proposed diagnostic criteria for MD, as embedded in the SCIMD, are presented in Table 1.

Table 1
Proposed Diagnostic Criteria for Daydreaming Disorder (Maladaptive Daydreaming)

Criteria	Description
A.	Persistent and recurrent fantasy activity that is vivid and fanciful, as indicated by the individual exhibiting two (or more) of the following in a 6-month period; at least one of these should be Criterion 1
1	While daydreaming, experiences an intense sense of absorption/immersion that includes visual, auditory, or affective properties
2	Daydreaming is triggered, maintained, or enhanced with exposure to music
3	Daydreaming is triggered, maintained, or enhanced with exposure to stereotypical movement (e.g., pacing, rocking, hand movements)
4	Often daydreams when feels distressed or bored
5	Daydreaming length or intensity intensifies in the absence of others (e.g., daydreams more when alone)
6	Is annoyed when unable to daydream or when daydreaming is interrupted or curbed
7	Would rather daydream than engage in daily chores, social, academic, or professional activities
8	Has made repeated unsuccessful efforts to control, cut back, or stop daydreaming
B.	The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning
C.	The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., dementia) and is not better explained by autism spectrum disorders, attention-deficit/hyperactivity disorder, schizophrenia spectrum disorders, bipolar I disorder, obsessive–compulsive and related disorders, dissociative identity disorder, substance-related and addictive disorders, an organic disorder, or a medical condition

Note. Current severity defined as follows: Mild = *experiences mainly distress, no obvious functional impairment*; moderate = *one area of functioning is affected (e.g., work)*; severe = *more than area of functioning is affected (e.g., work, school or social life)*.

Development of the SCIMD protocol. Based on the Structured Clinical Interview for *DSM-5* (First, Williams, Karg, & Spitzer, 2016), we adapted the proposed diagnostic criteria for MD into a structured interview format labeled the SCIMD (see Appendix). The SCIMD consists of a 10-question probe (and subsequent additional follow-up questions) for inclusion criteria and one probe for an exclusion criterion (and its follow-up questions). A diagnosis of MD is made if participants respond affirmatively to questions pertaining to two or more of the inclusion criteria (A1, at least one of A2–A8, and B) and the exclusion criterion (C—"not due to the direct physiological effects of a substance or a general medical condition"). Items are rated based primarily on the patient's response to the SCIMD items, to prompt questions, or to comparable alternatives to misunderstood items. Clinicians ultimately determine scoring of responses to items in Sections B and C.

Qualifications of the SCIMD interviewers. The first and fourth authors, both licensed mental health clinicians with over 25 years of experience, were the interviewers. The purpose of utilizing two interviewers was to assess SCIMD interrater agreement. The third author, a published developer of several diagnostic interviews, including the valid and reliable Dissociative Disorders Interview Schedule (Ross et al., 1989), played a key role in the development of the SCIMD and in the preparation of the interviewers. These three coauthors participated in a 1-hr online video conference aimed at refining the wording of the structured interview to maximize adherence to the original criteria while minimizing the use of jargon.

Demographic data. Participants were asked to indicate their name, e-mail address, age, sex, and country of residence.

Screening question. All participants answered an MD screening question that assisted the research team in initial classification of respondents as meeting or not meeting the criteria for MD. The MD screener question was worded as follows:

> Daydreaming is a universal human phenomenon that a majority of individuals engage in on a daily basis. We are interested in learning more about people's experience with what they regard as excessive or MD experiences, and we thank you for agreeing to participate in our research interview. For the purposes of the study, we define daydreaming as fantastical mental images

and visual stories/narratives that are not necessarily part of your life. Therefore, we are not referring to such acts such as reminiscing over past events, planning for future activities such as a meeting with your boss, or thinking about your mental "to do" list. We also do not include pure sexual fantasies in this study. Examples of daydreams that can be included would be hanging out with a favorite celebrity, winning the Nobel Prize, telling off your boss after winning the lottery, or having an affair with an attractive co-worker who isn't the slightest bit interested in you, living in a parallel fantasy world, engaging in heroic or rescue actions, speaking with historical figures, etc. Any daydreams involving fictional characters or plots should also be included. MD is defined as extensive (in terms of duration and/or frequency) daydreaming that can be experienced as addictive, replaces human interaction and/or interferes with academic, interpersonal or vocational functioning and/or creates emotional distress (for example: guilt, shame, frustration, sadness, anxiety). According to this definition, your daydreaming is (a) normal or (b) maladaptive.

The Maladaptive Daydreaming Scale (MDS). The MDS (Somer et al., 2016) is a 14-item self-report MD questionnaire that is rated on a 10-point Likert scale presented as percentages (0%–100%). The questions are framed in a normative way that does not stigmatize the respondent for positive responses. Typical MDS questions are, "Some people notice that certain music can trigger their daydreaming. To what extent does music activate your daydreaming?" and "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?" The respondent then marks the line, which is anchored at 0% on the left and 100% on the right, to show how often he or she has this experience. Criterion-related evidence for the MDS was demonstrated by its high correlation, $r = .58$, $p < .01$, with the most closely associated criterion measure: the Creative Experiences Questionnaire (Merckelbach, Horselenberg, & Muris, 2001), an instrument derived from Wilson and Barber's (1981) measure of FP. MDS scores were also associated with obsessive–compulsive behavior and thoughts, dissociative absorption, attention deficit, and high sense of presence during daydreaming (including involvement of the senses), but less with psychotic symptoms gauged by a self-report psychosis screener.

The MDS discriminated well between self-identified individuals with and without MD (overall and subscale mean scores differed between individuals with MD and controls with effect sizes of Cohen's $d = 1.8$ or higher), and it demonstrated sound internal consistency and temporal stability (test–retest reliability, $r = .92$; average time in between the administrations was 21.17 weeks; $SD = 5.62$ weeks). The MDS has previously shown excellent sensitivity (95%) and high specificity (89%) levels.

Based on evidence about the important role of music in MD (Somer, Somer, & Jopp, 2016b), we decided to add two additional items to the previously published MDS that gauge the relevance of music in the respondent's MD experience. We used the revised 16-item MDS (MDS-16) in the present study.

SCIMD. The interview is included in the Appendix.

Procedure

We obtained data via the Internet using Qualtrics software (Qualtrics, Provo, UT). Respondents were referred to an online informed consent form on which they were requested to confirm that they had read the provided information and description of the study and to indicate their agreement to participate in the study and for the investigators to use their data in future publications. On the same web page, participants were also requested to provide their name, age, gender, and country of residence. After providing informed consent, participants were referred to the next web page, on which they were presented with a screening question to verify that their self-identified MD is in line with our conceptualization of the phenomenon.

All self-identified individuals with MD endorsed Option B, identifying their daydreaming as maladaptive and were subsequently invited to send our research coordinator (RC) the e-mail address of a non-MD control participant who had accepted their request to take part in a study on daydreaming. Responding counterparts were contacted by our RC, who instructed them in how to fill in the informed consent form and the screening question. One recruited control participant endorsed Option B and, after verification by our RC, was indeed identified as likely meeting the criteria for MD. Her recruiting friend then replaced this control participant with a different matched counterpart, who endorsed Option A of the screening question.

When the recruitment process was completed, the RC forwarded the entire list of participants and their demographic data to the second author, who verified that the pairs were matched adequately. The RC then sent all participants a link to the online MDS, which they all completed, and forwarded a message alerting participants to expect to be contacted by the interviewers for two consecutive interviews. The RC also determined a random order for the interviews so that each interviewer was first in interviewing half of the participants and second in interviewing the other half (i.e., of the 62 participants, each interviewer was the first to interview 31). All participants were, thus, interviewed twice, each time by a different interviewer. Interviewers were blind to the classification of all respondents (MD or control), who were identified by a participant number allocated by the RC. Participants were instructed by the RC to identify themselves to the interviewers by their participant number only. Interviewers shared an online list with the interviewees' identification codes and e-mail addresses. Participants were contacted via email by the coauthor designated to be their first interviewer. Each completed interview was marked online, indicating to the second interviewer that s/he may contact the participant for the second interview. All interviews were conducted online with a video chat service.

Statistical Analysis

The primary aim of our study was to validate the SCIMD in three ways: (a) in terms of the agreement between the SCIMD and the participants' self-definitions as engaging in MD or not, (b) by assessing the interrater agreement between the two clinicians for the presence or absence of MD, and (c) by calculating the agreement between the SCIMD and the MDS. Thus, we calculated Cohen's kappa (Robins & Guze, 1970) values four times: (a) two times for the agreement rate between each interviewer and the participants' judgments regarding whether they suffered from MD, (b) one time for the agreement rate between the two interviewers as to whether each participant belonged to the MD or control group, and (c) one time for the concordance of the two diagnostic tools for MD, SCIMD, and MDS-16, after determining a cutoff score for MDS, as described below. Interrater agreement was calculated based on two categories: MD (regardless of severity rating) versus no MD. In accordance with the format of the SCIMD, in which "unspecified MD" is rated after the interviewer concludes that the individual does not meet full criteria for MD, ratings of "unspecified MD" were given a score of "no MD" for these analyses. Confidence intervals reported for interrater agreement variables were based on bootstrapping with 1,000 resamples, bias-corrected accelerated.

Our second aim was to further validate the MDS-16 and to determine a clinical cutoff score for this continuous measure, for optimal sensitivity and specificity in identifying individuals seeking online advice and support for self- identified MD. We first conducted a paired-samples t test to verify that the MDS-16 score is significantly higher in the MD group compared with the control group. Next, we reviewed to what extent each item, as well as the general score, is able to differentiate the two groups, by using receiver operating characteristic (ROC) curves (McFall & Treat, 1999; Swets, 1996; Swets, Dawes, & Monahan, 2000).

The ROC analysis uses the association between sensitivity and specificity to derive an area under the curve (AUC), which indicates how well a measure generally distinguishes between case-positive (MD) and case-negative (non-MD) individuals. A value of .50 on the AUC indicates chance level, whereas a value of 1.0 indicates a perfect diagnostic tool. We determined a cutoff score by examining the coordinates of the ROC curve for the total MDS score to ascertain the value that maximizes both sensitivity (accurately identifying true positives) and specificity (accurately identifying true negatives).

We also calculate the likelihood ratios (LRs) for the SCIMD, which combines information about sensitivity and specificity and gauges the extent to which a positive or negative result changes the likelihood that a patient would be diagnosed with the disorder. A LR of greater than 1 indicates that the test result is associated with the presence of the disorder. A LR less than 1 indicates that the test result is associated with absence of the disorder. LR+ refers to the probability of the person with the disorder to test posi-

tive, divided by the probability of the person without the disorder to test positive (the larger the better). LR– refers to the probability of the person with the disorder to test negative, divided by the probability of the person without the disorder to test negative (the smaller the better).

Results

Cohen's kappa when comparing each interviewer to the grouping variable was excellent, $\kappa = .84$, 95% confidence interval (CI) [.71, .96], Cramer's $V = .85$, 95% CI [.74, .97], for Interviewer 1, and good, $\kappa = .71$, 95% CI [.56, .84], Cramer's $V = .73$, 95% CI [.59, .85], for Interviewer 2 (for magnitude guidelines, see Fleiss (1981) and Landis and Koch (1977). The discrepancy between these values could reflect that Interviewer 1 had more experience in the field of MD than Interviewer 2.

Table 2 depicts the number of people in each group that were classified as MD or non-MD by each interviewer. As shown, for Interviewer 1, sensitivity was 83.87% and specificity was 100%. For Interviewer 2, sensitivity was 96.77% and specificity was 74.19%. We could not compute the LR for positive results (LR+) for Interviewer 1, because no controls were falsely classified as meeting criteria for MD. LR+ for Interviewer 2 was 3.75. The LR for negative results (LR–) was 0.16 for Interviewer 1 and 0.04 for Interviewer 2. Table 3 details the relation between each SCIMD question and the self-identification grouping variable. In addition, we computed Cohen's kappa (Cohen, 1960) for interrater agreement between the two interviewers. Our analysis yielded a good kappa value of $\kappa = .63$, 95% CI [.46, .80], Cramer's $V = .68$, 95% CI [.55, .82].

A paired-samples t test showed that individuals with MD had significantly higher scores on the MDS-16 compared with controls (MD group $M = 76.03$, $SD = 18.23$, control group $M = 21.94$, $SD = 11.59$, difference: $M = 5.41$, 95% CI [4.55, 6.27]), $t(30) = 12.90$, $p < .001$; (Cohen's d, corrected for dependence = 3.57). Next, ROC curves were computed for each MDS item and for the general score. Table 3 shows the AUC value for each. As can be seen in Table 4, all items had good to excellent AUC values, except for Item 16 (listening to music as a condition for MD), which yielded an AUC value that was lower, yet statistically significant. The general score for the MDS-16 yielded nearly perfect sensitivity and specificity ($AUC = .996$, $SE = .005$, 95% CI [.986, 1.000]). Table 5 shows the sensitivity and specificity values for different MDS total scores. As can be seen in the table, the optimal cutoff value for the MDS-16 seems to be a mean score of 50. When using the criterion that only participants scoring 50 or above will be classified as positive for MD, sensitivity is 96.8% (meaning that 30 out of 31 individuals with MD in this study would have been classified as such) and specificity is 100% (meaning that none of the 31 controls in this study would have been mistakenly classified as meeting criteria for MD).

After determining the cutoff score for the MDS-16, we calculated Cohen's kappa for the agreement of the cutoff identification with the SCIMD. Results were excellent, $\kappa = .81$, 95% CI [.65, .93], Cramer's $V = .81$, 95% CI [.66, .94], for Interviewer 1 and good, $\kappa = .68$, 95% CI [.50, .84], Cramer's $V = .70$, 95% CI [.54, .85], for Interviewer 2.

Table 2
Cross-Tabulation Indicating the Number of Individuals Correctly and Incorrectly Classified as Having Maladaptive Daydreaming (MD) by Each Interviewer

Classification	Interviewer	MD group	Control group	Total
Classified as MD	1	26 (83.87%)	0 (.00%)	26 (41.94%)
	2	30 (96.77%)	8 (25.81%)	38 (61.29%)
Classified as no MD	1	5 (16.13%)	31 (100.00%)	36 (58.06%)
	2	1 (3.23%)	23 (74.19%)	33 (53.23%)
Total		$n = 31$	$n = 31$	$N = 62$

Table 3
The Concordance Between Individual Structured Clinical Interview for Maladaptive Daydreaming Criteria and the Self-Identification Grouping Variable

Criterion	Interviewer	$\chi^2(df = 1)$	*p* Value	Cramer's *V* [95% CI]	κ [95% CI]	Sensitivity %	Specificity %
A	1	44.03	<.001	.84 [.71, .97]	.84 [.71, .94]	96.8	87.1
	2	36.56	<.001	.77 [.63, .90]	.74 [.57, .90]	100	74.2
A1	1	44.78	<.001	.85 [.73, .97]	.84 [.70, .97]	100	83.9
	2	34.10	<.001	.74 [.61, .87]	.71 [.54, .87]	100	71.0
A2	1	8.11	<.005	.36 [.15, .58]	.36 [.15, .55]	77.4	58.1
	2	7.05	<.01	.34 [.10, .56]	.32 [.10, .53]	80.6	51.6
A3	1	22.03	<.001	.60 [.42, .76]	.58 [.40, .74]	67.7	90.3
	2	20.93	<.001	.58 [.37, .76]	.58 [.39, .74]	80.6	77.4
A4	1	6.15	<.05	.32 [.06, .54]	.29 [.07, .49]	83.9	45.2
	2	12.13	<.001	.44 [.22, .62]	.39 [.19, .56]	93.5	45.2
A5	1	7.63	<.01	.35 [.14, .52]	.26 [.10, .43]	96.8	29.0
	2	13.37	<.001	.46 [.33, .60]	.36 [.19, .52]	100	35.5
A6	1	19.98	<.001	.57 [.36, .76]	.55 [.35, .74]	64.5	90.3
	2	23.69	<.001	.62 [.41, .81]	.61 [.41, .80]	74.2	87.1
A7	1	24.20	<.001	.63 [.42, .81]	.61 [.42, .79]	71.0	90.3
	2	15.55	<.001	.50 [.28, .69]	.48 [.28, .67]	61.3	87.1
A8	1	21.93	<.001	.60 [.42, .75]	.55 [.37, .71]	58.1	96.8
	2	19.37	<.001	.56 [.32, .74]	.55 [.33, .71]	67.7	87.1
B	1	32.06	<.001	.72 [.53, .87]	.71 [.52, .87]	77.4	93.5
	2	32.90	<.001	.73 [.54, .87]	.71 [.51, .87]	96.8	74.2
C[a]	1	—	—	—	—	—	—
	2	—	—	—	—	—	—

Note. CI = confidence interval, based on the bootstrapping procedure, with 1,000 resamples, bias-corrected accelerated.
[a] Data for Criterion C could not be calculated because it was a constant. Specifically, none of the participants seemed to the interviewers to exhibit maladaptive daydreaming–like symptoms that stem from a different disorder or medical condition.

Discussion

Validity of Maladaptive Daydreaming

Although more research is needed, our findings indicate that MD can be differentiated from normal psychology with excellent sensitivity and specificity. At a preliminary level, our data establish both the reliability of the diagnosis, in terms of interrater agreement (see below), and the concurrent validity of the SCIMD and MDS-16. This does not establish the ultimate validity of MD as a discrete disorder. For any disorder, such validation requires a series of studies with different measures and methodologies, and with a variety of samples obtained by different research groups.

A possible concern about the validity of MD as a discrete disorder is the reservation that it may simply represent an extreme variant of normal, or the far end of a continuum of normal daydreaming. In our opinion, this concern applies equally to most, if not all, *DSM-5* disorders, which all occur on a continuum from normal to increasingly severe and disabling symptoms. We do not view the continuum and discrete disorder models as mutually exclusive. For example, individuals who never consume alcohol are clearly in a discrete category compared to individuals who have consumed a bottle of hard liquor each day for the last 10 years. However, in between these two extremes is a continuum of increasing consumption, with no sharp cutoff between pathological and normal. Similarly, the problem of differentiating a normal variant from a discrete disorder presumably applies to depression, and contributes to the low interrater reliability of major depressive disorder in the *DSM-5* field trials (κ = .28; trials; Regier et al., 2013). Still, MD is uniquely characterized by a kinesthetic component, a need for evocative music, and an addictive yearning to compulsively engage in this mental behavior (Bigelsen et al., 2016; Somer, 2002; Somer et al., 2016, 2016a, 2016b). These characteristics

Table 4
Area Under the Curve (AUC) Results From Receiver Operating Characteristic Analysis for Each Maladaptive Daydreaming Scale (MDS) Item and for the Mean Total Score

MDS item	AUC	*SE*	Asymptotic significance	Asymptotic 95% CI
MDS 1	.840	.056	<.001	[.731, .949]
MDS 2	.927	.034	<.001	[.860, .993]
MDS 3	.947	.026	<.001	[.897, .998]
MDS 4	.930	.035	<.001	[.861, .998]
MDS 5	.919	.035	<.001	[.850, .988]
MDS 6	.942	.029	<.001	[.885, 1.00]
MDS 7	.920	.036	<.001	[.850, .990]
MDS 8	.968	.023	<.001	[.922, 1.00]
MDS 9	.964	.025	<.001	[.916, 1.00]
MDS 10	.899	.041	<.001	[.819, .978]
MDS 11	.934	.031	<.001	[.874, .995]
MDS 12	.896	.041	<.001	[.817, .975]
MDS 13	.900	.041	<.001	[.819, .981]
MDS 14	.895	.046	<.001	[.804, .986]
MDS 15	.903	.043	<.001	[.818, .988]
MDS 16	.678	.069	<.05	[.542, .814]
MDS total mean score	.996	.005	<.001	[.986, 1.00]

Note. CI = confidence interval.

represent a qualitative—not just a quantitative— disparity from normal daydreaming.

In an effort to differentiate pathological MD from normal daydreaming, we have adopted the *DSM-5* approach of requiring the presence of distress and/or functional impairment for a disorder, in this case MD, to be present. Similarly, we have adopted the common *DSM-5* approach of polythetic criteria set to acknowledge that MD can present with varying combinations of symptoms within its symptom domain. This is the same approach used in the *DSM-5* criteria sets for panic disorder, major depressive episode, and many other disorders.

Nevertheless, we have not demonstrated the validity of MD as an independent disorder for a number of reasons: We did not administer the Structured Clinical Interview for *DSM-5*–Clinician Version (Spitzer & Williams, 1985) or another structured interview to establish the comorbidity of MD and to rule out that it always cooccurs with one or more *DSM-5* disorders. We did not conduct clinical interviews to rule out the possibility that the participants were feigning MD, or that their MD was simply an artifact of Internet contamination associated with participation in online MD forums. Finally, we used a self-selection process to establish that the participants met the criterion for MD, rather than a semistructured face-to-face clinical interview.

Interrater Agreement for Maladaptive Daydreaming

In the *DSM-5* field trials (Regier et al., 2013), Cohen's kappa values were generated for 15 adult diagnoses and eight child and adolescent diagnoses: Five had kappa values of .60–.79, nine had values of .40–.59; six had values of .20–.39, and three had values of less than .20. These field trials yielded kappa values of .28 for major depressive episode and .46 for schizophrenia. Cohen's kappa for MD in the present study were .63–.84. Based on the standards adopted for the *DSM-5* field trials (Regier et al., 2013), the SCIMD can diagnose MD with very good reliability. Similarly, we found that the self-report measure for MD, the MDS-16 succeeded in differentiating individuals with MD from controls with excellent sensitivity and specificity, with the optimal cutoff score for the MDS-16 equal to 50.

Table 5
Coordinates of the Receiver Operating Characteristic Curve for the Mean Maladaptive Daydreaming Scale (MDS)-16 Total Score

MDS-16 cutoff score	Sensitivity %	Specificity %
.00	100	.0
10.31	100	9.7
—[a]	—	—
32.81	100	83.9
36.56	100	87.1
40.63	96.8	87.1
42.19	96.8	90.3
45.94	96.8	93.5
49.69	**96.8**	**100**
50.31	93.5	100
51.25	90.3	100
—	—	—
106.25	3.2	100
118.13	.0	100

Note. The optimal cutoff score, maximizing both sensitivity and specificity, is in boldface (MDS-16 mean of 49.69). Because the next score in line is well over 50, the MDS optimal cutoff score may be considered to be a score of 50.
[a] Rows with em dashes (—) indicate that there were additional values in between that are not shown in the table, as they have no practical significance.

Differential Diagnosis of Maladaptive Daydreaming

Our data do not directly address the problem of the differential diagnosis of MD. We have, however, included a set of differential diagnostic considerations in Criterion C, which is the exclusion criterion for MD. Again, we have followed the general decision rules and procedures of *DSM-5* in this regard. In our clinical experience with MD, the disorder overlaps with, and co-occurs with, a number of different *DSM-5* disorders, such as attention-deficit/hyperactivity disorder, obsessive–compulsive spectrum disorders, and major depression. However, our clinical understanding to date is that MD is neither completely independent from, nor entirely accounted for, by the presence of another disorder. That is, a simple primary–secondary relationship between MD and other disorders does not seem to exist. Nevertheless, in keeping with *DSM-5* rules, we have left it to the clinician's discretion to make a clinical judgment as to whether, in a given case, MD is better accounted for by another disorder.

Treatment Requirements of Individuals With Maladaptive Daydreaming

Moreover, our study did not examine the treatment requirements of individuals with MD. All we can say at this point is that, in our clinical experience, MD usually does not resolve when only other diagnoses are addressed in treatment. Now that we have established an operational definition of MD, and found support for the reliability of the disorder, future researchers can examine the comorbidity of MD and develop potential models to guide treatment.

Strengths and Limitations

The strengths of our study are as follows. Two independent interviewers conducted blind interviews; we administered both a structured interview and a self-report measure; participants with MD and controls were well matched by sex, age, and country; and we secured an international sample that represented many different countries. Finally, we documented Cohen's kappa values in the good-to-excellent range that are well above those obtained for depression and schizophrenia in the *DSM-5* field trials.

Nevertheless, our study has a number of limitations, some of which were discussed earlier. It is based on only one sample and replications with other samples are required to confirm our initial findings. Also, it remains to be seen whether other investigators can diagnose MD with good reliability. Furthermore, control respondents were recruited by participants with MD and might, therefore, be particularly motivated to engage in the research and contrast themselves with their partner. In line with previous reports that shame and concealment of MD is a key characteristic of individuals coping with MD (e.g., Somer et al., 2016a), many participants convinced their counterparts to participate in a study on daydreaming without disclosing their own MD. It is also conceivable that our MD sample is select in that individuals who were able to identify and enlist participants to accompany them might differ systematically from individuals unable or unwilling to enlist other participants. Future studies should include individuals who are unable or unwilling to recruit control counterparts with a matched sample or control participants recruited by the researchers. Our interviews were conducted over the Internet. It would be useful to conduct in-person interviews in future research. Future studies should also include measures of response sets or social desirability bias and measures of symptom exaggeration. Additionally, researchers should continue to investigate whether the interrater reliability of MD can be increased by modifications to the current diagnostic criteria. Another question not addressed in our study is how to understand and clarify the boundaries between MD and unspecified MD, and whether this diagnostic distinction has any meaningful treatment implications.

Conclusions

Overall, we believe that our data demonstrate that MD is worthy of further investigation and appears to be a disorder that can be diagnosed reliably, although definitive confirmation of the validity of MD will require additional research. Although MD appears to be a behavioral addiction to absorptive fantasy, we are well aware that we have not provided definitive evidence of the validity of MD as a distinct disorder. Such evidence cannot be provided readily in a single study and requires a series of steps and replica-

tions at each step. We do, however, believe that we have provided promising preliminary evidence of the reliability of MD and the utility of the MDS-16 and SCIMD.

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Appendix

Structured Clinical Interview for Maladaptive Daydreaming (SCIMD)

Instructions to Interviewers

Each item should be asked exactly as written. Clarification can be provided if the interviewee appears not to understand the question. Follow-up each item with further exploration or additional clarification of symptoms until you have enough information to rate the item confidently.

Interviewer:

Participant:

A. In the last 6 months, have you experienced persistent and recurrent fantasy activity that is vivid and fanciful and also persistent and recurrent?

Yes = 1, *no* = 2, *yes, but less than 6 months* = 3 [ ]

1. While daydreaming, have you experienced an intense sense of immersion, (being completely absorbed) that includes visual, auditory (sound), or affective (feelings and emotional) properties?

Yes = 1, *no* = 2 [ ]

2. Is your daydreaming triggered, maintained, or enhanced with exposure to music?

Yes = 1, *no* = 2 [ ]

3. Is your daydreaming triggered, maintained, or enhanced with exposure to repetitive movement (e.g., pacing, rocking, hand movements)?

Yes = 1, *no* = 2 [ ]

4. Do you often daydream when feeling distressed or bored?

Yes = 1, *no* = 2 [ ]

5. Does the length or intensity of your daydreaming increase in the absence of others?

Yes = 1, *no* = 2 [ ]

(*Appendix follows*)

6. Are you annoyed when you are unable to daydream or when your daydreaming is interrupted, curbed?

Yes = 1, *no* = 2 [ ]

7. Would you rather daydream than engage in daily chores or social, academic, or professional activities?

Yes = 1, *no* = 2 [ ]

8. Have you made repeated unsuccessful efforts to control or stop your daydreaming?

Yes = 1, *no* = 2 [ ]

B. Does your daydreaming cause significant distress or does it impair your social, academic, occupational, or other important areas of functioning?

Yes = 1, *no* = 2 [ ]

C. Indicate if the disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition.

Interviewer, ascertain that MD is not better explained by autism spectrum disorders, attention-deficit/hyperactivity disorder, dementia, schizophrenia spectrum disorders, bipolar disorder, obsessive–compulsive and related disorders, dissociative identity disorder, substance-related and addictive disorders, an organic disorder, or a medical condition.

Yes = 1, *no* = 2 [ ]

The respondent is positive for MD disorder if the answers were *yes* to A1, positive for one other A criterion, positive for B, and positive for C.

If individual meets criteria for MD, rate if mild, moderate, or severe.

Mild: experiences mainly distress, no obvious functional impairment.

Moderate: one area of functioning is affected (e.g., work).

Severe: more than one area of functioning is affected (e.g., work, school or social life).

Absent = 1; *present, mild* = 2; *present, moderate* = 3; *present, severe* = 4 [ ]

Rate if unspecified MD*

Yes = 1, *No* = 2 [ ]

* Unspecified MD = a form of MD that does not meet the full criteria for MD disorder. This is the case when Criterion A is 3 (less than 6 months in duration).

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