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Could immersive daydreaming underlie a deficit in attention? The prevalence and characteristics of maladaptive daydreaming in individuals with attention-deficit/hyperactivity disorder

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Abstract

Objective: Maladaptive daydreaming (MD) entails excessive immersion and engagement in complex fantasy worlds, causing distress and impairing functioning. Maladaptive Daydreamers often report that existing diagnostic labels are unhelpful for them. Previous studies reported high rates of comorbid attention deficit hyperactivity disorder (ADHD) among persons with MD, raising the question of their separateness. This study explored whether MD differs essentially from ADHD by examining an ADHD sample, hypothesizing a much lower incidence of MD.

Method: Adults diagnosed with ADHD ($N = 83$) were assessed for ADHD symptoms, MD, depression, loneliness, and self-esteem. Participants who exceeded the study's cutoff score for suspected MD were invited to participate in a structured diagnostic interview for MD.

Results: In accordance with the hypothesis, only 20.5% of the ADHD sample met the proposed diagnostic criteria for MD. Compared with ADHD-only participants, this subgroup presented increased depression, loneliness, and lowered self-esteem.

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Conclusion: MD has unique clinical characteristics that are distinct from ADHD. We suggest that in some cases presenting with ADHD symptoms, an MD conceptualization may better explain the clinical picture. Future research should aim at a better differentiation of daydreaming, ADHD, and related constructs such as mind-wandering.

1 | INTRODUCTION

Daydreaming is often defined as a mental activity characterized by fanciful imagery, involving an inner focus of attention on images and events with varying degrees of probability of actually occurring (Christoff et al., 2016; Singer, 1974). In some cases, daydreaming may involve absorption: being completely immersed in fantasy, thus narrowing attention and neglecting some aspects of external reality (Soffer-Dudek & Somer, 2018). Although daydreaming is a universal activity experienced by most people daily (Singer, 1974), its unique nature raises a question regarding the circumstances in which it may predispose to psychopathology.

Several researchers refer to daydreaming as an adaptive consciousness state. For example, as creating a platform for processing daily experiences and problem-solving, in a way that cannot be resolved under standard, goal-oriented, logical thinking (Butler, 2006). Daydreaming has also been claimed to enable future planning, creative thinking, decoupling of attention, the implementation of multiple goals, and perhaps a resting strategy for assimilation (Hartman, 1958; Klinger & Cox, 1987; McMillan et al., 2013; Singer, 1974, 2009).

However, other researchers identified less adaptive aspects of daydreaming. For example, Wilson and Barber (1981) coined the term "fantasy proneness" to describe persons with a tendency for frequent, elaborate, and extremely vivid fantasy activity, characterized with unusual perceptual experiences (e.g., difficulty to distinguish between fantasy and reality, psychosomatic experiences), which they concluded served in some cases as a coping strategy for loneliness, isolation or an aversive environment. Further investigation into the relationship between fantasy proneness and psychopathology revealed that fantasizers exhibited significantly more depression and dissociative symptoms than controls (Rauschenberger & Lynn, 1995, 2003). In a different study, 70% of fantasizers showed signs of maladjustment or psychopathology, specifically with an indication for schizophrenia spectrum symptoms (Merritt & Waldo, 2000). Zelin et al. (1983) concluded that daydreaming may represent a passive and ineffective way of coping with psychological distress. Greenwald and Harder (1995) suggested that psychological distress intensified the tendency for excessive daydreaming and found that frequent daydreaming was related to lower self-esteem. In conclusion, it seems that there is substantial evidence that excessive fantasy is highly associated with psychopathology. Newer studies also show that the mind drifting from actions in the present moment is predictive of dysphoria, stress, and decreased happiness and well-being (Killingsworth & Gilbert, 2010; Smallwood et al., 2007; Vannikov-Lugassi & Soffer-Dudek, 2018).

Different terms purportedly describe concepts similar to daydreaming. For example, mind wandering, task unrelated thoughts, stimulus-independent thoughts, absorption, and fantasy proneness. The absence of unifying terminology makes it nearly impossible to compare various forms of mentation and their adaptivity. Additionally, a deficit or variability in implementing attentional capacities is defined as a mental disorder, in the form of attention deficit/hyperactivity disorder (ADHD), inattentive type, but this definition does not distinguish between different

sources of attentional variability or attempt to describe the mental activity occurring in place of task-focusing. Interestingly, the literature on daydreaming tends to refer to it as a secondary symptom of distress, or a coping method. This is exemplified in the suggested disorder named sluggish cognitive tempo (SCT) (Carlson et al., 1986) in which daydreaming is considered as a secondary symptom of SCT while the hallmarks of SCT are considered to be attention impairment and slowness (Barkley, 2013). Although highly related to daydreaming as a core symptom (Becker, 2021), researchers also describe the SCT mental state as a kind of "fog," similar to a sleep-like state of drowsiness, which is reminiscent of ADHD phenomenology (Penny et al., 2009). Such a "dreamy" state is quite different than the mental activity of intensely engaging in fanciful, narrative, and vivid fantasy, which would also be termed daydreaming. Individuals who tend to engage in intense imaginative activity often report that they were working efficiently on "auto-pilot" while doing so, which may suggest the opposite of slowness or sluggishness (e.g., see autobiography by Vivian Conan, 2020, p. 58, describing her detailed immersion in rich inner worlds, preparing a fancy dinner party as an imagined alternate identity, while in reality working relentlessly at making holes in garments at a sewing factory). In this study, we define daydreaming according to the latter view, rather than a psychological "fog." The contradictory definitions of daydreaming point to a need to shed light on different types of mentation and their relationships with psychopathology and adaptivity.

Specifically, perhaps daydreaming is akin to other mental states that can be positioned on a spectrum of normality and abnormality (e.g., anxiety). It seems that, like other mental phenomena, daydreaming may cause distress when its intensity, frequency, and duration are excessive, and when it impairs key areas of functioning (Soffer-Dudek & Somer, 2018).

Maladaptive daydreaming (MD) refers to compulsive fantasy activity characterized by immersive imagination and shifting of attention toward a rich inner world while neglecting social, occupational, and academic activities (Bigelsen & Schupak, 2011; Somer, 2002). It is a form of behavioral addiction embodied by a constant urge to daydream and to be absorbed in a self-directed imaginary world (Pietkiewicz et al., 2018). In many cases, repetitive movements and exposure to music serve as triggering or enhancing mechanisms for this behavior (Somer, Somer, et al., 2016b; Somer, Soffer-Dudek, et al., 2017). Many of the fantasies provide emotional compensation such as in themes involving emotional support, social competency, or gaining recognition (Somer, Somer, et al., 2016a; Somer, Somer, et al., 2016b). Although this activity is experienced as rewarding in the short run, it evolves into a time-consuming habit that may impede well-being and important areas of functioning (Bigelsen & Schupak, 2011; Bigelsen et al., 2016). Because of its compulsive, addictive nature, MD creates further distress associated with the time wasted and the widening gap between the idealized fantasy and reality, a disillusionment that is often eased with further daydreaming (Somer, 2018). Thus, in addition to the traditional view that psychological distress may lead to daydreaming as a form of escapism (e.g., Greenwald & Harder, 1995), in recent years it is becoming evident that excessive daydreaming may become in itself pathological and represent a focal problem, causing other psychopathological symptoms and decreasing well-being. Indeed, in a time-lag analysis based on daily diary entries of 77 self-identified maladaptive daydreamers (henceforth, MDers), negative emotion increased on the days following increased MD activity, and not the other way around (Soffer-Dudek & Somer, 2018). Growing evidence of the unique construct of MD led to the development of classification instruments for MD; the MDS-16 which is a self-report scale used as a screening tool (Somer, Lehrfeld, et al., 2016) translated and validated to numerous languages and studied in several countries around the world (Abu-Rayya et al., 2019; Balestra, 2019; Jopp et al., 2018; Sandor et al., 2020; Schimmenti et al., 2020), and the structured clinical interview for MD, assessing diagnostic criteria developed for MD (Somer, Soffer-Dudek, et al., 2017).

One of the dire consequences of MD is the ensuing difficulty in sustaining attention. According to the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, American Psychiatric Association, 2013) difficulty in sustained attention is a symptom of several disorders involving attention deficits, with ADHD being the primary one. People suffering from ADHD often experience their mind to be gone elsewhere in the absence of an obvious stimulus and are easily distracted, displaying poor or variable attentional capacity and compromised regulation of behavior and thoughts (Bozhilova et al., 2018). In recent years, inattentiveness in the

context of ADHD was associated with a related vein of research, namely, mind wandering (MW) (Franklin et al., 2017; Seli et al., 2015). MW is often defined as a passive mental activity of associative thoughts that are stimulus-independent and unrelated to the task at hand (Smallwood & Schooler, 2015). However, this terminology is somewhat problematic, in that it is associated with blurred differentiation between various cognitive states that could be considered as MW (e.g., daydreaming and task unrelated thoughts) (Murray et al., 2020). This ambiguity in terminology is pivotal to the study of MD. MDers often report that existing diagnostic labels are unhelpful and insufficient for them (Bigelsen & Schupak, 2011). For example, in a study on 90 MDers, one participant reported telling her doctor about her experiences, and in return, the doctor "looked at me with one eyebrow raised and told me it's nothing to worry about," which left her feeling that the doctor did not understand the depth of her fantasizing or the distress that it causes; this was reported to be a frequent complaint of the 23% of participants in the sample who had sought psychological therapy (Bigelsen & Schupak, 2011, p. 1645), and has been replicated in additional accounts (e.g., Somer, Somer, et al., 2016a). As a result of their feeling that existing psychopathological categories are insufficient for their problem, many MDers advocate for raising awareness of the concept of MD and medicalizing it (Bershtling & Somer, 2018). But if we are to suggest that MD is a distinct disorder, we must conclude that MD is different from, or represents a unique origin of, inattention (i.e., not equivalent to the already existing diagnosis of ADHD, and different from the thought dynamic commonly associated with ADHD, namely, excessive MW). In this study, we addressed MW according to the dynamic view which argues that MW is best defined by its dynamics, as unguided thoughts moving rapidly from topic to topic without a certain course or aim. This approach is opposed to defining MW based on task-relatedness or the trigger for its occurrence (Irving & Thompson, 2018). Based on this point of view, MW in the context of ADHD differs from daydreaming in three key characteristics. First, the spontaneous, nondeliberate nature of the thoughts interrupting other engagements in MW, compared with the often purposeful activation of the daydreaming state in MD. Relatedly, a study within a student sample that explored the differences between deliberate MW, defined as an intentional shift of attention toward internal content, versus spontaneous MW, defined as an uncontrolled shift of attention, found that the spontaneous type was more strongly associated with ADHD than the controlled type (Seli et al., 2015). Second, whereas MDers report being aware of their daydreaming activity while they are engaged in it (e.g., controlling physical jerks and facial expressions while daydreaming in public, becoming upset when daydreaming is interrupted, or experiencing a kind of doubled or layered consciousness where the fantasized world and real-world coexist; Soffer-Dudek & Somer, in press), MW commonly does not involve meta-awareness. Consequently, noticing the fact that thoughts are drifting happens only when one is pulled back to focus on external reality. Franklin et al. (2017) demonstrated how the relationship between ADHD and MW was mediated by the lack of awareness, suggesting decreased meta-cognition and little sense of agency when the mind wanders. A third and perhaps most important feature that characterizes MW and differentiates it from MD is its lack of guidance, the scatteredness of the content of thoughts, or how thoughts evolve without attentional conscious effort to keep track of the content. MW content tends to be drifting rather than stable (Irving, 2016). In contrast, MD involves a complex, fantastical, narrative plot. Taken together, it seems that contrary to MD, the distractibility and inattention in what we believe should be regarded as "true" ADHD is identified by MW: a spontaneous, nondeliberate mental activity of changing thoughts with little awareness to their ongoing occurrence (Smallwood & Schooler, 2006). However, unfortunately, the DSM-5 does not put much emphasis on the nature of the mental activity in ADHD but rather focuses mainly on the behavioral outcomes (e.g., difficulty completing tasks). Thus, we suggest that possibly different mental activities resulting in concentration impairments may contribute to meeting criteria for an ADHD diagnosis, although they may stem from different psychological mechanisms, and perhaps even require different treatment approaches.

Relatedly, dissociative "absorption and imaginative involvement" (Armstrong et al., 1997; Carlson & Putnam, 1993), the tendency to become immersed in internal or external stimuli while neglecting the surroundings, is highly related to MD (Soffer-Dudek & Somer, in press; Somer, Lehrfeld, et al., 2016), and is differentiated from attention deficit. Specifically, in a factor analysis of over 300 undergraduate students, ADHD and MW measures were not completely differentiated, whereas dissociative absorption emerged as a unique construct (Soffer-Dudek, 2019).

Similarly, in an MD sample, MD and MW were identified as different constructs with sleep disturbance as the common factor underlying the association between the two (Marcusson-Clavertz et al., 2019). Another attention-related concept involving narrowing of focus and immersion into a specific stimulus associated with ADHD is the concept of hyperfocus (Brown, 2006). Like dissociative absorption, hyperfocus is also characterized by an intense engrossment in one's subject of interest while disregarding other goals, commitments, and even body sensations. However, hyperfocus is often associated with external rather than internal subjects of interest, which can vary (Ozel-Kizil et al., 2016). As an externally directed shift of attention, it differs quite significantly from shifting one's focus toward internally generated content.

To conclude, although MW and MD share some overlapping behavioral outcomes of attention impairment as a focal symptom, their internal dynamics are rather different. MD consists of immersed absorption in daydreaming, with a heightened awareness and deliberate entry into the daydream, as well as a guided, coherent, evolving fantasy comprised of a fanciful storyline. Conversely, MW is characterized by spontaneous distractibility, scattered thoughts, and decreased awareness of one's consciousness state. Both excessive MW and MD may result in an overlap with some ADHD inattention symptoms (e.g., often has difficulty sustaining attention; often does not seem to listen when spoken to directly; often does not follow through on instructions and fails to finish; often has difficulties organizing tasks and activities; is often easily distracted by extraneous stimuli) and in some cases even with meeting DSM-5 criteria for ADHD, but we posit that MW dynamics are more appropriate for the theoretical understanding of ADHD, whereas MD features a compulsive urge to escape from reality in favor of fantasy while, in turn, neglecting real life. Therefore, we suggest that MD may be more suitable to be classified either as a dissociative disorder or a behavioral addiction rather than an attentional impairment.

Previous studies have shown the concomitance of MD and ADHD. For example, in a study of 340 self-identified MDers, participants described an elevated rate of ADHD symptoms compared with controls (Bigelsen et al., 2016). Similarly, a full Structured Clinical Interview for DSM-5 (SCID-5) (First et al., 2015) conducted among 39 adult MDers revealed that 77% of the sample met criteria for ADHD, mostly of the inattentive type (Somer, Soffer-Dudek, et al., 2017). However, those who met the criteria for ADHD also spontaneously reported in their clinical interview that their behavioral addiction to fantastical daydreaming impaired their attention. They viewed the attentional problem as a resulting or secondary factor, stemming from their main predicament which was their addiction to fantasizing.

Relatedly, in a recent study on the experienced outcome of prescription and recreational psychoactive drugs among 202 MDers (Ross et al., 2019), not only were stimulants reported to have next to no positive effect on participants' daydreaming patterns, but they were also reported to increase MD symptoms. This provides initial support for the idea that the essence of the problem in MD is probably not inattention, and is in line with MDers' reports that existing treatments do not address their main symptoms and are largely ineffective in improving the MD (Bigelsen et al., 2016).

The striking rate of ADHD in an MD sample (77%; Somer, Soffer-Dudek, & Ross, 2017) raises a possible criticism of the construct of MD. Specifically, it could be argued that there is no justification for the newer concept of MD if the two conditions are not reliably distinct. Alternatively, it is possible that addiction to immersive fantasy will very frequently result in an impairment in one's ability to concentrate on external tasks, but not vice versa; in other words, a deficit in attention or concentration abilities will not necessarily indicate the existence of immersive fantasy. Thus, a complementary exploration of MD rates in an ADHD sample was required, which was the focus of this study. Specifically, in this study, we aimed to explore whether MD can be differentiated from ADHD. We did this by assessing whether all/most or just a subset, of individuals with ADHD, will display the characteristics of MD. We posited that if different mechanisms account for attention impairment in these hypothetically distinct conditions, we could identify two subgroups in a sample formally considered a cohesive ADHD sample. If screening for MD in a sample of people with ADHD would yield a similarly high comorbidity rate (i.e., well over 50%), we could deduce that the concepts ADHD and MD are not reliably distinguishable from one another, which would render the more recent term of MD superfluous. However, if the concepts are distinct, there should be an a-symmetry in the

respective prevalence rates. In this case, it would be conceivable that the high rate (77%) of individuals meeting criteria for ADHD in an MD sample may stem from MD manifesting in ADHD-like behavioral symptoms that are better explained by MD (i.e., addiction to daydreaming causing a secondary attention deficit). Conversely, many other individuals may suffer from ADHD due to MW dynamics (i.e., difficulty concentrating and easily becoming distracted), a process unrelated to MD. In that case, we would expect a much lower rate of MD in an ADHD sample (i.e., significantly under 50%), as most cases of attention deficit would not necessarily stem from MD. Still, the prevalence of MD in a sample of people diagnosed with ADHD might be significantly higher than the prevalence of MD in the general population (which is not currently known), but nevertheless far from comprising most of the sample. This is the first study designed to identify the prevalence of MD within an ADHD sample.

We aim to shed light on the co-occurrence of MD and ADHD among adults diagnosed with ADHD. We hypothesized that a small subgroup of respondents with ADHD will also meet the diagnostic criteria for MD. Attention impairments among those individuals may stem from MD as a causing factor. Both MD and ADHD are characterized by a high level of comorbid psychopathology (Anastopoulos et al., 2018; Bigelsen et al., 2016; Ross et al., 2019; Somer, Soffer-Dudek, Ross, & Halpern, 2017; Somer, Soffer-Dudek, & Ross, 2017); however, in the absence of specific therapeutic protocols for MD, we assumed that the subset of ADHD participants who also suffer from MD will show higher levels of concomitant distress symptoms and less satisfaction with therapy due to poorer response to ADHD therapy interventions. Consequently, our study hypotheses were: (1) In a sample of adults diagnosed with ADHD, the prevalence rate of MD will be substantially lower than 77%. (2) In comparison to those with ADHD but without MD, participants with both ADHD and MD will report elevated rates of psychological distress, specifically, depression, loneliness, and low self-esteem. (3) In comparison to those with ADHD-only, participants with both ADHD and MD will be less satisfied with their ADHD treatment and will report lower treatment efficacy.

2 | METHOD

2.1 | Participants and procedure

A call for voluntary participation in a study of ADHD was published in online ADHD communities, word of mouth, and through an advertisement posted in two mental health clinics. MD was not mentioned in the recruitment advertisement to avoid biases in the procedure of sample recruitment. The recruiting advertisement requested participants who had been diagnosed with ADHD and had documentation to support this that they could present (see details below). One-hundred and ten individuals self-identified as suffering from formally diagnosed ADHD completed an online survey. Two respondents did not specify their age, one specified that they were underage, and one presented a formal document that did not include an ADHD diagnosis but rather only learning disabilities. We, therefore, omitted them from the sample. Additionally, some participants did not provide formal documentation of their diagnosis as they were requested. We posited that this might have been the result of disorganization symptoms characterizing ADHD that challenged their efforts to locate their documents or remember to send them. As participation in this study was voluntary and did not involve compensation, it is reasonable to assume that in the absence of financial reward, our sample comprised genuine ADHD respondents who were motivated to support a research study about their condition. Thus, we pursued an inclusive approach for the analyses in which we included participants who either presented a formal document confirming their diagnosis or exceeded the ASRS cutoff for probable ADHD (Kessler et al., 2005). [1] Following this process, we excluded eight additional participants who did not submit any document and also failed to meet the ASRS cutoff score. Consequently, the full sample size was $N = 98$. Twenty-five participants of those who were included in the study did not present formal documentation but exceeded the ASRS cutoff score. Of the rest of the sample, the submitted documents confirming the participants' ADHD diagnoses were heterogeneous[2]: 22.4% were by a psychiatrist, 7.1% by a psychologist, and 12.2%

forwarded results from specific ADHD diagnostic procedures (such as Brain Resource Cognition [BRC], Test of Variable Attention [TOVA], or the continuous performance test: MOXO-CPT)—these indicated that the participants had indeed undergone a comprehensive assessment for ADHD to further confirm psychiatric evaluation, as these cognitive tests are routinely employed in Israel by mental health professionals in the context of ADHD-specific diagnostic evaluation centers as confirmatory ADHD assessments). A further 7.1% of documentation were forwarded by a neurologist, 11.2% forwarded their prescriptions for ADHD medication, 7.1% provided a diagnosis from their family doctor records, and 4.1% presented other third-party reports of diagnosed learning disabilities, either including a diagnosis of ADHD or a comment that ADHD is probably present but requires further assessment for a formal diagnosis. In addition, 4.1% stated that they were formally diagnosed but felt uncomfortable sharing their medical records. Those who scored above a predetermined cut-off score on the MD scale were suspected of having MD and were invited to partake in an online diagnostic interview (see Section 2.2). However, 15 individuals had not responded to our invitation for the follow-up assessment, precluding an objective determination of their MD status. Hence, to avoid any bias in the presentation of the data, wherever possible we report results for the full sample ($N = 98$), whereas, in analyses that rely on the comparison of ADHD + MD versus ADHD-only groups, we did not include participants for whom we could not independently determine their MD status, resulting in a sample of $n = 83$ for those analyses.

This study was approved by the Institutional Review Board at the University of Haifa. Volunteer respondents provided online informed consent.

The sample was primarily female (70.4%, $n = 69$ out of $N = 98$). The average age was $M = 34.84$ ($SD = 10.41$, range: 18–70). Online questionnaires were available in English and Hebrew. Geographically, there were 66.3% from Israel, 14.3% from the United States, 10.2% from Europe, and the remaining 8.2% from Australia and South Africa.

2.2 | Measures

2.2.1 | Maladaptive daydreaming (MD)

The 16-item Maladaptive Daydreaming scale (MDS-16) is a self-report inventory that can distinguish well between MD and non-MD populations (Somer, Lehrfeld, et al., 2016). Items of the MDS represent four underlying dimensions of MD (Soffer-Dudek et al., 2020), namely, yearning and immersed daydreaming (7 items, e.g., "When you first wake up in the morning, how strong has your urge been to immediately start daydreaming?"), distress and impairment (5 items, e.g., "How distressed do you currently feel about the amount of time you spend daydreaming?"), kinesthesia (2 items, e.g., "How often are your current daydreams accompanied by physical activity such as pacing, swinging or shaking your hands?"), and music (2 items, e.g., "To what extent is your daydreaming dependent on continued listening to music?").

Each item is rated on an 11-point Likert scale presented as percentages: 0% (Never) to 100% (Extremely frequent), representing how often the respondent experienced the situation described within the past month. A final score is calculated by averaging all items, which means that the total score ranges from 0 to 100. The MDS has an empirically derived cut-off score of $M = 40$ which was found to most adequately screen adults with MD originally reported as $M = 50$ in Somer, Soffer-Dudek, Ross & Halpern, 2017 but recently corrected, see: https://fac0c99d218c46beb5c906d8b9d5ddbf.usrfiles.com/ugd/fac0c9_0791d1bce773444d8a2ba10d9c2d35f1.pdf. In that study, the suggested cutoff score had perfect specificity (i.e., no one without MD was identified as having MD), and very accurate sensitivity (only one person with MD was under the cutoff score and was thus falsely identified as not having MD). In this study, we used a less exclusive cutoff point of 30.13; in other words, any respondent scoring over 30.13 was considered as possibly suffering from MD and was therefore invited to participate in the online diagnostic interview to further inquire if MD is indeed present[3]. Cronbach's α for the MDS-16 in this study was 0.94.

After MD scores were obtained, participants scoring 30.13 and above were also assessed by a Structured Clinical Interview for Maladaptive Daydreaming (SCIMD) (Somer, Soffer-Dudek, et al., 2017). Following training by the study supervisor (Eli Somer), a clinical professor of psychology, the first author (Nitzan Theodor-Katz) conducted all the clinical interviews. The SCIMD was developed based on the proposed diagnostic criteria for MD (Somer, Soffer-Dudek, et al., 2017) and was administered in a structured interview format based on the SCID for DSM-5 (First et al., 2015). It consists of a 10-question probe for inclusion criteria and one probe for an exclusion criterion indicating that the symptoms cannot be better explained by a physiological condition or another psychopathology (e.g., drug addiction, psychotic disorders, bipolar disorder, OCD, DID, or medication-induced symptoms). As suggested in the paper reporting on the SCIMD, diagnosis of MD was given only in cases of significant psychological distress or obvious functional impairment stemming from daydreaming (Somer, Soffer-Dudek, et al., 2017). In this study, we put a special emphasis on the differentiation of MD from ADHD and/or MW. Participants were asked specifically if they considered their narrative fantasy activity—as opposed to other thought patterns—as distressful or as causing them impairments in social relationships, academic achievements, or occupational functioning. Moreover, participants were asked specifically what type of mentation distracts them when they experience difficulties in focusing their attention. Participants who described rapidly changing, unguided thoughts or worries, and ruminations as the dominant type of mentation impairing their attention were classified as "ADHD-only." Furthermore, participants who described their fantasy patterns as adaptive, controllable, with no negative effect on their functioning or well-being, or when their dominant type of distracting mentation did not match MD's characteristics (continuous, imaginative, vivid fantasies with an unfolding storyline that involves a strong yearning for fantasy) were also allocated to the ADHD group. The interview was designed to determine whether immersive daydreams indeed served as the primary cause for the interviewee's attention impairment.

2.2.2 | Attention-deficit and hyperactivity disorder (ADHD)

The Adult ADHD Self-Report Screening Scale (ASRS) is a widely used 18-item scale developed by the World Health Organization (WHO) as a means for providing a valid self-report measure of adult ADHD symptoms (Adler et al., 2006; Kessler et al., 2005). Each symptom is rated on a 0 (Never) to 4 (Very often) scale. The total score was calculated by averaging all items. The 18 items correspond to the 18 possible symptoms for diagnosing ADHD, which were overall carried over from DSM-IV to DSM-5, although there were some changes in the phrasing of the examples for the criteria in DSM-5. Thus, we treated the ASRS as an overall valid assessment tool for ADHD as it is defined by DSM-5. Cronbach's α for the 18 items in this study was 0.85.

2.2.3 | Treatment responsiveness

ADHD treatment efficacy was measured by a 13-item instrument created for this study (the full questionnaire may be found in the supplementary material file). In this measure, we inquired about the provided pharmacological and psychotherapeutic services. Participants reported whether they had ever received treatment for their ADHD (in the present or past), as well as the type and duration of treatment. If treatment was not indicated, participants were asked to state the reason. For each type of treatment (psychotherapy and pharmaceutical), three items assessed the extent to which there was a relief from symptoms due to treatment, the extent of satisfaction from the outcome of the treatment, and the extent to which quality of life increased following treatment. The items were rated on a 0 (Not at all) to 10 (Significant effect) Likert-type scale. A final score was calculated by averaging all three items for each treatment type. Both pharmaceutical and psychotherapy final scores of the complete sample ranged from 0 to 10 with $M = 6.31$, $SD = 2.35$ and, $M = 5.92$, $SD = 2.8$, respectively. Cronbach's α was 0.91 for pharmacological treatment and 0.88 for psychotherapy.

2.2.4 | Depressive symptoms

Depressive symptoms were measured by the Beck Depression Inventory—short form (BDI-SF) (Beck & Steer, 1993), aimed to gauge the cognitive and affective aspects of depression: sadness, pessimism, lack of satisfaction, social withdrawal, indecisiveness, difficulties in work, fatigue, eating disorders, sense of failure, guilt, rejection, self-esteem, and suicidal ideation (Furlanetto et al., 2005). This short version of Beck's inventory includes 13 items, scored on a scale of 0 (I don't feel...) to 3 (Feel all the time). A final score was calculated by summing all items for a total continuous score. Cronbach's α in this study was 0.90.

2.2.5 | Loneliness

The University of California, Los Angeles Loneliness Scale (UCLA Loneliness Scale) is a 4-item self-report inventory regarding experiences of loneliness and social isolation, shortened from the UCLA-20. Items are rated from 1 (I never feel this way) to 4 (I often feel this way). A total score was calculated by summing all items (Russell et al., 1978, 1980). Using the translation and back translation technique, we translated the inventory into Hebrew. Cronbach's α in this study was 0.73.

2.2.6 | Self-esteem

Self-esteem was assessed by the Rosenberg Self-Esteem Scale (RSE), a widely used self-report instrument. It scrutinizes positive and negative self-beliefs by asking participants to indicate their level of agreement with each statement on a 4-level Likert-type scale ranging from 1 (strongly agree) to 4 (strongly disagree) (Rosenberg, 1965). A total score was calculated by summing all items. Reversed items were recoded for data analysis. The Hebrew translation followed the same translation and back-translation technique. Cronbach's α in this study was 0.87.

2.3 | Analytic strategy

Missing data were less than 5% for all items measuring ADHD, MD, depression, self-esteem, and loneliness, hence data completion strategies were unnecessary (Tabachnick & Fidell, 2007). In some cases, participants provided vague answers to items measuring the duration of their therapies. In those instances, data were completed by cross-checking information (e.g., comparing one's age from the demographic data to the date of the formal diagnosis document). In some cases, however, answers were still inconclusive. In five cases vague responses were provided regarding the duration of pharmacological therapy and there was one vague response concerning the duration of psychotherapy (e.g., "a few years," "only during my college degree"). We resolved this problem by entering medians ($Me = 4$ and $Me = 1.75$, respectively). After these data corrections, two items had substantial missingness: effectiveness of pharmacotherapy: $n = 63$ reported receiving this treatment in the present or past but only 58 rated their satisfaction from it (8% missingness), and effectiveness of psychotherapy: $n = 39$ reported receiving this treatment in the present or past but only 29 rated their satisfaction from it (25.64% missingness). Due to considerable missing data in these variables, multiple imputations were used to complete missingness. However, after missing data were imputed, results were similar with no significant difference, so we report the nonimputed results.

The data were screened for univariate outliers. Outliers were detected only in one case for depression items ($z > 3.29$) and corrected by reducing the sum score to a single unit above the next highest score. Skewness and kurtosis were acceptable (between −1 and 1) for all variables, except for a borderline kurtosis value of −1.11 for

loneliness. Thus, we assumed that the variables had approximately normal distributions and did not utilize transformations.

First, we tested how many respondents from the ADHD sample may also be diagnosed with MD; a significance test for the difference between two proportions explored whether the prevalence rate was significantly different than 77%. Next, after two groups were identified (an ADHD-only group and an ADHD + MD group), demographic differences between the groups were examined (age with a t-test, and sex, education, and familial, socioeconomic, and occupational status by using χ^2 tests). To test our second and third hypotheses we conducted t tests for independent samples comparing the means of our distress variables (depression, loneliness, and low self-esteem) and treatment satisfaction variables between the groups. However, treating MD as a dichotomous variable (as done in the t tests) resulted in not using the full range of the variance of MD as well as losing the 15 dropouts from the interview, which may both contribute to decreased statistical power. Hence, we also planned to examine the study's Hypotheses 2 and 3 by treating MD as a continuous variable and calculating correlation coefficients between the questionnaires for the full $N = 98$ sample. Moreover, this approach enabled us to assess the strength of the relationships between MD and distress while controlling for ADHD symptoms. This allowed us to examine shared variance which cannot be explained by ADHD. Because those diagnosed with MD constituted only a small subsample, normality was unlikely; thus, a bootstrapping approach assessing statistical significance (using 1000 resamples) was employed in all analyses.

3 | RESULTS

Out of 98 participants who completed the research questionnaire, $n = 45$ (45.91%) scored at or above 40, the recommended cutoff score for probable MD. Since we applied a more inclusive cutoff score (See Section 2), 59 respondents (60.20%) were invited to participate in the clinician-administered diagnostic interview. Fifteen invitees did not respond.[4,5] Thus, 44 participants were interviewed, whereas 39 scored below the threshold and required no further assessment. Of the 44 interviewees, $n = 17$ (38.63% of the interviewees), met the proposed diagnostic criteria for MD. The 27 participants who exceeded the self-report cutoff but did not meet the diagnostic criteria as assessed in the interview were deemed by us as false positives and allocated to the no-MD (ADHD only) group. Specifically, when asked in the questionnaire about their daydreaming experiences, many of them wrongly assumed that the questions pertained to their worries, ruminations, or MW, causing inflated scores that did not reflect their daydreaming pattern, which the detailed interview revealed to be not immersive or fanciful, with no complex dialogues or narratives. In other cases, false positives had elevated ratings because they seemed to be endowed with the trait of immersive daydreaming. However, they presented neither functional impairment nor distress due to their daydreaming pattern, suggesting that their daydreaming was not pathological.[6]

The 17 participants who met MD proposed diagnostic criteria represented only 20.48% of the final ($n = 83$) sample, lending support to our hypothesis that the rate of MD in this sample would be much lower than 77% (Hypothesis 1). Notably, however, the 15 participants who never responded to our interview invitation were over the study's cutoff, suggesting a selective dropout pattern from this study. Thus, leaving them out of the analysis may have biased the result to reflect a lower rate than the true rate of positive MD in an ADHD sample. As the rate of positives out of interviewees (who were similarly over the cutoff) was 38.63%, it is reasonable to assume that a similar rate of positives would be found among the 15 dropouts. This stringent estimation would result in a final rate of 23.26% of MD within the full sample of $N = 98$. Thus, even when taking into account possible bias due to selective dropouts, the MD incidence in this ADHD sample would still be significantly smaller than the comparable figure of the ADHD rate of 77% among persons with MD reported in a previous study. We conducted a formal comparison of proportions and found that the difference is indeed statistically significant, whether using the result of 20.48% ($n = 83$, $z = -5.22$, $p < 0.00001$) or the estimation that takes dropouts into account, of 23.26% ($n = 98$, $z = -5.02$, $p < 0.00001$).

Out of the 83 study completers, participants identified as ADHD-only (scored under the self-report cutoff mark or were assessed as negative for MD according to the interview) were labeled as Group 1, whereas individuals with both ADHD and MD were labeled Group 2. An independent samples t test confirmed their dissimilar MDS-16 scores ($M_1 = 27.90$, $SD_1 = 20.07$; $M_2 = 60.33$, $SD_2 = 14.57$; $t_{(2, 83)} = -7.518$, $p < 0.001$; Hedge's $g = 0.88$). ASRS scores were not significantly different between the groups ($M_1 = 2.45$, $SD_1 = 0.61$; $M_2 = 2.61$, $SD_2 = 0.56$; $t_{(2, 83)} = -0.937$, $p = 0.352$, Hedge's $g = 0.575$), suggesting that ADHD symptom severity did not differ across the two groups.

Table 1 presents descriptive statistics for the demographic variables. There were no significant demographical differences[7] between the research groups, except for socioeconomic status ($\chi^2_{(83)} = 8.484$, $p = 0.004$, $\phi c = -0.32$), showing that on average, Group 2 (ADHD + MD) had lower socioeconomic status.

We predicted (Hypothesis 2) that in the absence of MD-specific therapy protocols, Group 2 will present higher levels of additional comorbid psychopathology. In line with our hypothesis, participants with both conditions scored significantly higher on all clinical scales: depression, loneliness, and poor self-esteem (BDI: $M_1 = 7.39$, $SD_1 = 7.31$; $M_2 = 12.00$, $SD_2 = 6.30$, $t_{(2, 81)} = -2.378$, $p = 0.020$, Hedge's $g = 0.647$; UCLA: $M_1 = 10.39$, $SD_1 = 3.40$; $M_2 = 12.11$, $SD_2 = 2.61$, $t_{(2, 81)} = -1.939$, $p = 0.031$, Hedge's $g = -0.52$; RSE: $M_1 = 20.04$, $SD_1 = 6.51$; $M_2 = 24.35$; $SE_2 = 4.62$, $t_{(2, 81)} = -2.56$, $p = 0.012$, Hedge's $g = 0.68$).

We also treated MD as a continuous variable and calculated Pearson's correlation coefficients on the full sample. As can be seen in Table 2, MD correlated strongly with depression, low self-esteem, and loneliness. Because significant correlations were also found between ADHD symptoms and depression and low self-esteem, we also controlled for the ASRS (see Table 2 in brackets). After controlling for ADHD symptom severity, correlations with

TABLE 1 Tests for demographic differences between the ADHD-only group and the ADHD + MD group (either χ^2 test or Fisher's exact test)

| | | ADHD- only (Group 1) | | ADHD + MD (Group 2) | | | | | | |
| | | (n = 66) | | (n = 17) | | | | | | |
		n	%	n	%	df	FET	χ^2	p	Phi
Item Gender	Female	46	69.7	14	82.4	1	0.29	-	ns	-0.07
	Male	20	30.3	3	17.6					
Family status	Single	29	43.9	9	52.9	1	-	0.44	ns	-0.07
	Partnership	37	56.1	8	47.1					
Education	nonacademic	15	22.7	7	41.2	1	0.13 -		ns	-0.16
	Academic	51	77.3	10	58.8					
Socioeconomic status	Not working-low income	21	31.8	12	70.6	1	-	8.484	0.004	-0.32
	Moderate-high income	45	68.2	5	29.4					

Note: In cases of less than five cases at the expected table cells for dichotomous variables, Fisher's exact test was employed.
Abbreviations: χ^2, chi-square test; FET, Fisher's exact test; ns, nonsignificant.

MD were still statistically significant. Thus, it seems that the severity of ADHD symptoms cannot account for the relationships between MD and comorbid symptoms of depression, low self-esteem, and loneliness[8].

Finally, we hypothesized that Group 2 will demonstrate a poorer response to ADHD therapy interventions (Hypothesis 3). In both groups, the majority of participants reported that they had received pharmacotherapy for ADHD at some point in their lives (approximately 77.3% from Group 1 and 70.6% from Group 2, no significant differences in the groups' proportions were detected). Of the 63 participants reporting past or current pharmacotherapy, 58 rated their level of satisfaction ($n = 47$, 71.21%, from Group 1 and $n = 11$, 64.71%, from Group 2). We identified no statistically significant group difference in patient satisfaction regarding pharmacotherapy for ADHD, nor did the groups differ significantly in the duration of therapy (see Table 3).

Participants of Group 2 (ADHD + MD) reported a significantly elevated rate of receiving psychotherapeutic help (70.58%) compared with Group 1 (ADHD-only) (40. 9%) ($z = 2.1864$, $p < 0.05$). Of the 39 participants reporting past or current psychotherapy, 29 rated their level of satisfaction (77.77% from Group 1% and 66.66% from Group 2). There were no statistically significant differences in psychotherapy satisfaction. The groups also did not differ significantly in the duration of therapy.

In an exploratory, post hoc descriptive examination of the participants' treatment preferences and adherence, we noticed a possible divergence in the therapy profiles characterizing the groups. Whereas the two groups did not significantly differ in their therapy satisfaction, they seemed to exhibit distinct preferences of intervention. A table presenting these data may be found in the Supporting Information File.

4 | DISCUSSION

This study explored whether there may be an identifiable subgroup of individuals suffering from MD within a sample of adults with ADHD and whether this subgroup may manifest unique characteristics, in terms of psychopathology presentation. This exploration was based on the notion that a majority of adults with MD will meet the criteria for ADHD but that their attention deficit is secondary to their core problem of becoming addicted to their immersive, fanciful daydreaming. Our main hypothesis was supported. Contrary to the very high rate of ADHD in adult MD samples (Bigelsen et al., 2016; Somer, Soffer-Dudek,& Ross, 2017), we found, as specified in Hypothesis 1, a significantly lower incidence of MD among adults with ADHD. If we would have found symmetrically high rates of MD among ADHD adults, it would have been fair to claim that the newer concept of MD is superfluous, as it is almost equivalent to the already-existing diagnosis of ADHD. However, the a-symmetry found in this study (20%–23% MD in ADHD as opposed to the previously detected 77% ADHD in MD) agrees with our theoretical claim that MD is an independent mental phenomenon, which often creates a deficit in attention as a side-effect, causing MDers in some cases to also meet criteria for ADHD, but not necessarily vice versa. Moreover, we found that ADHD symptoms did not differ in severity across the groups, again supporting the idea that MD is not secondary to ADHD, nor is ADHD a predisposition to MD, but rather, MD is a discrete construct.

Since MDers suffer from a considerable difficulty in attending to external tasks, they may, conceivably, receive a diagnosis of ADHD and score highly on the ASRS. Our results imply the importance of considering MD as a differential diagnosis when assessing ADHD. In other words, we argue that had MD been recognized as a formal DSM disorder, then perhaps in some cases of addictive fantasy activity the clinical picture would have been better explained by the concept of MD, rendering the ADHD diagnosis superfluous. This idea should be further tested and replicated in future studies.

One possible reason for the high comorbidity rates of ADHD in MD samples is the blurred boundaries between the concept of daydreaming and closely related concepts such as distraction, MW, and "absorption and imaginative involvement." Dissociative absorption is a key component of MD (Somer, Somer, et al., 2016b; Somer & Herscu, 2017). It represents the tendency to become engrossed inwardly (as in daydreaming) or outwardly (as in reading a book or watching a movie) while narrowing attention to the stimulus (Carlson & Putnam, 1993). Soffer-dudek

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TABLE 2 Pearson correlation matrix for the study variables

Variable	MDS-16	ASRS	BDI-SF	RSE	UCLA
MDS-16	1.00	0.280* [0.051.0475]-	0.358* [0.151,0.571] (0.302*) [0.095,0.517]	0.366* [0.164,0.541] (0.314*) [0.122,0.501]	0.309* [0.116,0.486] (0.303*))[0.091,0.485]
ASRS		1.00	0.289* [0.106,0.458]	0.271* [0.098,0.430]	0.066 [−0.109,0.230]
BDI-SF			1.00	0.766* [0.667,0.845]	0.398* [0.221,0.551]
RSE				1.00	0.397* [0.211,0.564]
UCLA					1.00
M	37.15	2.51	8.72	21.28	10.76
SD	22.97	0.59	7.24	6.23	3.30
Range	0–90.63	0.67–3.89	0–32	10–36	4–16

Note: Means, standard deviations, range, and correlation coefficients with Bootstrapped 95% confidence intervals are presented. Bolded values indicate the partial correlation coefficient between Maladaptive Daydreaming and depression, self-esteem, and loneliness, when ADHD symptomatology (the ASRS variable) is controlled for. Confidence Intervals are presented under each correlation in square brackets.

Abbreviations: ASRS, ADHD Self Report Screening Scale; BDI-SF, Beck Depression Inventory- Short Form; M, mean; MDS, Maladaptive Daydreaming Scale; RSE, Rosenberg Self Esteem Scale; SD, standard deviation; UCLA, University of California, Los Angeles Loneliness Scale.

*p < 0.01.

TABLE 3 Differences in pharmacological and psychotherapy satisfaction and duration, between the ADHD-only group and the ADHD + MD group

Item	ADHD-only (Group 1)			ADHD + MD (Group 2)			Mean difference	Bootstrapped 95% CI	t	Hedge's g
	N	M	SD	N	M	SD				
Pharm. Dur.	47	6.09	5.16	11	3.41	5.89	2.68	−0.82,5.83	1.584	0.64
Pharm. Sat.	47	6.40	3.04	11	5.54	2.62	0.860	−0.61,2.67	1.031	0.59
Psych. Dur.	19	3.84	4.42	7	2.61	4.28	1.23	−2.78,4.70	0.5580	0.56
Psych. Sat.	21	5.65	3.18	8	5.66	3.19	0.010	−2.19,2.31	−0.013	0.50

Note: Due to the small sample sizes, a normal distribution was unlikely, and thus significance was determined based on the bootstrapped confidence interval; hence, no *p* level is included in the table.

Abbreviations: ADHD, attention deficit hyperactivity disorder; MD, maladaptive daydreaming; Pharm. Dur., pharmacotherapy duration; Pharm. Sat., pharmacotherapy satisfaction Psych. Dur., Psychotherapy duration; Psych. Sat., Psychotherapy satisfaction.

(2019) demonstrated that dissociative absorption is distinct from both attention-deficit symptoms and MW, whereas the latter two were somewhat intertwined. Additionally, in a recent theoretical comparison of MD with several other mental activities involving shifting attention toward inner experience, the authors showed that MD and MW shared the fewest characteristics, including only "waking activity" as a common factor (Schimmenti et al., 2019).

Although MD entails difficulty in sustaining attention on external tasks, the dynamic of the internal experience seems to be very different than ADHD and MW. Specifically, MD-related absorption in vivid and fanciful daydreaming alters the sense of agency and includes a motivation to direct attention inwardly while being purposefully oblivious to the surrounding reality. Conversely, MW is not actively self-directed; it is associative, unguided, and fragmentary (Irving, 2016). Indeed, the typical distraction characterizing a sample of 69 young adults with ADHD was spontaneous MW (Seli et al., 2015). Thus, we suggest that although MDers present with some phenomenological symptoms that are included in the ADHD diagnostic criteria, the mechanisms at play may be quite different than those operating in what is considered typical ADHD inattention presentation.

In line with Hypothesis 2, the ADHD + MD group reported significantly greater levels of psychological distress: higher levels of depression, decreased self-esteem, and increased loneliness. These differences could not be explained by ADHD symptom severity, which was not different between groups. Moreover, their lower socioeconomic status may suggest more severe occupational impairment. These higher distress levels and lower functioning levels indicate the necessity for personalized therapeutic interventions that consider the unique characteristics of MD.

Importantly, the cross-sectional design of this study prohibits the identification of causality in the relationship between the measured variables. However, our data add further evidence to the higher rate of concomitant psychopathology in persons with MD, as found in previous studies (Ross et al., 2019; Somer, Soffer-Dudek, & Ross, 2017). Shared symptoms among various DSM-5 (American Psychiatric Association, 2013) disorders have long troubled the mental health community (e.g., Preskorn & Baker, 2002). This acknowledged weakness of a major nosology system in mental health underscores the importance of improving the sensitivity and specificity of existing diagnostic procedures. Considering that MD is not yet recognized in the DSM, and yet according to our findings, it has clinical significance (as the subgroup with both ADHD and MD presented with higher distress and loneliness), we maintain that an MD or MD + ADHD case diagnosed simply as having ADHD could result in suboptimal treatment (Somer, 2018), or could even exacerbate distress due to feeling misunderstood (as reported in Bigelsen & Schupak, 2011). Indeed, many individuals who diagnose themselves with MD state that current diagnostic

definitions do not provide them with a suitable name for their problem, which makes it difficult for them to explain their symptoms to their therapists and receive proper help (Bershtling & Somer, 2018; Somer, Somer, et al., 2016a) Future randomized controlled trials should carefully evaluate the effect of ADHD treatment on purposeful (albeit compulsive) fanciful daydreaming compared with nondirected distractions such as MW.

We found no support for Hypothesis 3, according to which ADHD + MD cases would be less satisfied with their treatment and would report lower treatment efficacy compared with ADHD-only cases. Both research groups reported only partial satisfaction from pharmacotherapy and psychotherapy alike. The lack of group differences in treatment satisfaction could be attributed to two methodological reasons: First, the small size of the ADHD + MD group made it difficult to identify any between-group differences. Notably, since not all participants attended therapy of any kind, the sample size for this analysis was smaller than other group comparisons in this study. Second, due to the attention difficulties of this sample, we devised a very brief measure assessing the effects of therapy. This may have reduced the sensitivity and the internal validity of the scale, thus compromising our ability to capture between-group differences. However, a third cause for the absence of group differences in treatment satisfaction might be a true lack of substantial differences. In other words, our data suggest that both groups may have felt equally (un)satisfied.

The descriptive results do, however, point toward a unique characteristic of treatment-seeking preference in the two groups. Specifically, ADHD + MD participants seemed to be more inclined to turn to combined pharmacotherapy and psychotherapy. These findings justify the consideration of unique therapy protocols for those with MD. Indeed, previous case descriptions of individuals with MD illustrated the need for a tailor-made intervention (Schupak & Rosenthal, 2009; Somer, 2018). The deficiency in specialized care for MD is probably reflected in the growing number of large online MD communities in which participants post distressed calls for specialized clinical help (Bershtling & Somer, 2018). Moreover, although both groups scored similarly on scales measuring perceived therapy outcome and satisfaction, the nature of their dissatisfaction may be different. Specifically, some interviewees indicated that stimulant-based medication enhanced their concentration not only in daily life but, paradoxically, also in their daydreaming activity; a possibility that was previously mentioned in the literature (Somer, 2018). In these cases, pharmacotherapy might result in prolonged fantasy time and compromised adherence to daily responsibilities. Notably, a study by Ross et al. (2019) exploring the responses of MDers to prescription and recreational psychoactive drugs in a sample of 202 self-identified MDers, psychotropic medications, and specifically stimulants, showed next to no effect on daydreaming. This finding is in line with the current sample's tendency to turn more to psychotherapy for their attention difficulties. Future research should investigate how ADHD therapy affects the urge to daydream as a motivated, enjoyable mental activity as opposed to its effect on off-task MW.

This study has several limitations. First, although our initial sample size of 98 adults with ADHD was not particularly small, some of our analyses relied on smaller sample sizes, which may have led to the failure to detect any differences in treatment satisfaction. Furthermore, the lower education level of the 15 dropouts compared with their 44 interviewed counterparts might have affected the generalization of the study's findings. Generally, future studies should include both a control group of non-MD and non-ADHD participants, and an MD-only group to shed more light on the cases where both conditions coexist, which would contribute to further validation and generalization of the differences found. Second, although this study's sample was presumably clinical, ADHD diagnoses were not standardized. Future research should replicate these findings employing a more uniform diagnosis process for both MD and ADHD, by administering the MD structured interview to the entire sample and with consideration of ADHD subtypes. Additionally, the ASRS, although compatible with the 18 symptoms checklist of criterion A of DSM-5, was created following DSM-IV nosology. The use of a fully up-to-date measure per the DSM-5 changes can add further accuracy to this differentiation process. A third limitation concerns the internal consistency of the procedures and a possible confirmation bias. Specifically, participants were interviewed by one clinician, precluding the exploration of inter-rater reliability for the interview process. Moreover, as only individuals with probable MD were interviewed, the interviewer was aware of their elevated MDS-16 scores and may have

been influenced by confirmation bias. Also, because not all respondents were interviewed, the ability to identify false negatives was compromised. These limitations notwithstanding, the interviewer probed the respondents punctiliously. Specifically, the interviewer was aware that an ADHD sample is likely to score higher on the MD scale due to inaccurate employment of the term *daydreaming*. She was striving to differentiate such possible confounds from "true" MD. Consequently, only a small subset (about a third) of interviewees was eventually diagnosed as suffering from MD, suggesting that the interviewer's confirmation bias may have been minimal. Moreover, the participants were unaware that the clinical interview aimed to assess MD, which reduced any bias that may have been caused by the wish to propitiate the researcher or by fear of stigma. Finally, this study was based on a cross-sectional design that does not allow inferences about directionality or causality, making it impossible to determine the course of the studied psychopathologies. Future studies with a longitudinal design, perhaps assessing children diagnosed with either MD or ADHD, may shed more light on the developmental trajectory of the shared comorbidity. Furthermore, it is also essential to explore whether reports of comorbidity between MD and ADHD are a result of a conceptual ambiguity in the differentiation between daydreaming and excessive MW. This may generate knowledge of more effective ways to reduce the associated lifetime distress caused by MD.

5 | CONCLUSIONS

MDers have reported a diminished ability to sustain attention externally due to their tendency to give in to the lure of their inner fantasy world (Somer, Somer, et al., 2016a). Consequently, evidence shows a 77% comorbidity rate with ADHD among adults with MD, most of them meeting the diagnostic criteria for the Predominantly Inattentive type (Somer, Soffer-Dudek, & Ross, 2017).

In line with our hypothesis and theoretical account of MD as a separate syndrome characterized mainly by dissociative absorption and behavioral addiction, we found a much smaller incidence of MD among adults with ADHD, with a prevalence rate of around 20%–23%. These results provide support for the notion that MD is not conceptually enmeshed with the construct of ADHD. In other words, our ability to identify two subgroups in an ADHD sample provides evidence in favor of considering MD as a unique disorder. Although this small subgroup did meet the criteria for ADHD, the attention deficit observed in those cases with MD may be a consequence of their compulsion to daydream (Somer & Herscu, 2017).

We maintain that the diagnosis of ADHD does not adequately describe the problem in such cases. Although this should be explored in future studies, we believe that the inattention mechanism in MD may be essentially different from that experienced by people with "pure" or typical ADHD. Thus, we posit that if MD were included in the DSM, the diagnosis of ADHD might have been superfluous in certain cases. This is because MD would better explain the clinical picture including the resulting inattention. Further studies are warranted to examine this idea and provide more evidence suggesting whether MD should be considered as a disorder in psychiatric diagnostic nosology.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ENDNOTES

[1] According to the Adult ADHD Self-Report Scale (ASRS) (Kessler et al., 2005) a positive score of at least four items from part A of the questionnaire indicates that the respondent has symptoms highly consistent with ADHD in adults. Although the ASRS is compatible with DSM-IV diagnostic criteria, changes in DSM-5 criteria became more inclusive, hence in the absence of some participants' formal documentation, using the ASRS as an indication was more rigorous.

[2] Participants' documentation generally did not specify ADHD presentation type (inattention vs. hyperactivity-impulsivity).

[3] This expanded cutoff score stemmed from a mistake in the calculation of the mean score for all participants. Notably, however, this mistake does not pose a threat to the validity of the study; it merely suggests increased sensitivity in identifying MD, at the expense of increased effort on our part (i.e., more interviews). Importantly, the study was not biased toward a false positive result since participants who scored above 30.13 were only diagnosed with MD if they fulfilled criteria based on the structured clinical interview for MD.

[4] Of these 15, only 10 scored over 40, which is the recommended cutoff score.

[5] Out of the 59 participants who were invited to interview, we compared demographics between those who agreed and interviewed and the 15 who did not respond. All demographic variables did not differ between these groups (age, gender, socioeconomic status, and familial status), except for education, which was significantly lower among dropouts ($\chi^2_{(59)}$=4.861, p = 0.027, ϕc = 0.28).

[6] Nevertheless, we also conducted analyses when excluding the false positives altogether from both groups. Results remained unchanged, unless specified otherwise.

[7] In addition to the categorical variables in the table, age differences were examined with a t test, indicating no significant differences between the two groups (M = $_1$34.26, SD_1 = 9.36, M_2 = 34.18, SD_2 = 11.77; $t_{(2, 81)}$ = .030, p = 0.976, Hedge's g = 0.502).

[8] When reanalyzing the correlations while excluding false positives, the correlation between MD and ADHD became nonsignificant; These excluded individuals being the source of the MD-ADHD overlap is in line with the notion that they represent false positives, that is, they self-reported their ADHD symptoms as MD. The correlations between MD and the distress variables remained significant, whether ADHD symptoms were controlled for or not.

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