The Influence of Attachment Styles on Student Depression and Sleep: Risk or Resilience Factor?

Efremov, Emilie

Universiteit Leiden

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Emilie Efremov

Universiteit Leiden
Institute of Psychology
Master's degree program: Clinical psychology
Student number: s2086352
Supervisor: Eiko Fried Ph.D.
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Abstract

Attachment Theory offers a valuable lens for understanding predisposition to mental disorders and sleep patterns. The study first investigated the distribution of the attachment styles (AS) - secure, anxious, avoidant, and disorganized - within different Major Depressive Disorder (MDD) groups. Then, the relationship between AS and sleep patterns was explored. This multicohort study sampled 444 university students. Participants were screened for past and current MDD symptoms using self-report assessments from the Lifetime Depression Assessment Self-Report (LIDAS) and the 9-item Patient Health Questionnaire (PHQ-9). The participants were divided into one of four MDD groups - absence, onset, recovered, and chronic - based on their PHQ and LIDAS scores (e.g., participants with high scores on both measures were classified as chronic). Sleep satisfaction and patterns (e.g., waking episodes during the night) were assessed with self-reports using a Likert scale. Results showed a statistically significant relationship between AS and MDD. Specifically, the anxious style was significantly associated with the chronic group and the secure style with the absence group. The secure style was more prominent in the recovered group than in the onset and chronic groups. The disorganized style was more prominent than expected, potentially providing evidence for the secondary organized style theory. Finally, a significant effect was found for sleep satisfaction. The other analyses on sleep patterns provided mostly null results. These findings emphasize the importance of considering attachment styles in understanding and treating MDD. Future research should further explore these connections and the implications for prevention and treatment strategies in student populations.

Lay Abstract

Major Depressive Disorder (MDD) is a widespread and severe mental health issue. University students are particularly vulnerable to MDD due to the instability and pressures of young adulthood. Attachment theory (AT) emphasizes the importance of early caregiving and its influence on emotional regulation, providing a solid ground for the elaboration of MDD's development. A two-dimensional model of the attachment continuum based on avoidance and anxiety has given rise to four attachment styles: secure, anxious, avoidant, and disorganized. It has been found that individuals with insecure attachment styles are more prone to developing MDD and have poorer sleep quality and satisfaction. This study aimed to better understand the connections between attachment styles, sleep, and MDD in university students. The first goal was to investigate the distribution of the participant's attachment style in relation to their depressive symptoms, which were divided into four groups - absence, onset, recovered, and chronic - based on their past and current MDD symptoms. The second goal was to investigate if insecure attachment styles resulted in lower sleep satisfaction and higher rates of sleep problems. The results revealed that the secure style was more prominent in the absence and recovered group, whereas the anxious style was more present in the chronic and onset group. The sleep results were mixed: the secure style did report higher sleep satisfaction, and the other sleep problems led to inconclusive results. Future research could focus on the application of these findings for treatment and prevention of student depression.

The Influence of Attachment Styles on Student Depression and Sleep

Major Depressive Disorder & Attachment Theory

Major Depression Disorder (MDD) is a modern pervasive plague - it has been predicted that by 2030, it will be the leading cause of disability worldwide (Mathers & Loncar, 2006). Symptoms entail sad affect, anhedonia, abnormal sleep patterns and appetite, fatigue, difficulties in concentration, and dysfunctional feelings of guilt and worthlessness (Dagan et al., 2018). MDD impairs cognitive, physiological, and emotional functioning in diverse contexts of personal and professional life (Hirschfeld et al., 2002). Relapse is frequent, and residual symptoms can evolve into chronic depression (Conradi et al., 2018), with a lifetime prevalence of 20% worldwide (Cai et al., 2020). MDD can affect all age groups, with a steady rise within younger populations where psychopathologies are prone to emerge (Musa et al., 2020). Some have suggested that this rise may be connected to the tumultuous nature of young adulthood itself (Kuwabara et al., 2007; Stern & Thayer, 2019). This phase of life is marked by significant life changes, unstable relationships, and increased autonomy and responsibilities (Sussman & Arnett, 2014) which leave university students particularly at risk.

Many theories have suggested the critical role of cognitive and interpersonal factors in MDD (Beck & Greenberg, 1984). Attachment theory (AT) provides a solid ground for the elaboration of MDD's development throughout the lifespan. Conceptualized as an emotion regulation theory, it offers an operational link between attachment and mental health (Mikulincer & Shaver, 2012). Its framework has been a building block of developmental psychology, allowing valuable insight into the shaping processes of life-long cognitive and behavioral pathways formed by early caregiving (Bowlby, 1988). AT emerged from Bowlby's groundbreaking research on the bonds between infants and their caregivers. It posits two core

premises. The first is that the human need for proximity, referred to as the attachment behavioral system, is intrinsic to human nature. Second, it asserts that the initial primary attachment figures lay the foundation of the dynamics of future relationships (Bowlby, 1969). According to this theory, infants have an innate inclination to form bonds with caregivers, communicating their need for protection and care while seeking proximity. Through these repeated patterns of interaction with the attachment figures, infants develop a collection of mental representations about the self, others, and the world - also known as an internal working model (IWM) of attachment (Bowlby, 1969). The capacity for emotional and behavioral regulation throughout the lifespan has been hypothesized to be influenced by the IWM (Hankin et., 2005). It encompasses beliefs about one's self-worth and expectations about others, notably their availability and trustworthiness to meet one's social, emotional, and physical needs (Bowlby, 1969). Attachment figures shift from caregivers in childhood to peers and romantic partners in adulthood. The IWM activates when interacting within the context of significant relationships, resulting in specific behavioral and emotional patterns according to one's attachment orientation (Bowlby, 1988).

Primary and Secondary Attachment Styles

With the refinement of AT, a two-dimensional model of the attachment continuum based on avoidance and anxiety has given rise to four types of orientations (Ainsworth et al., 2015; Hankin et al., 2005). The first type is the secure attachment, characterized by low avoidance and low anxiety. It is brought about by consistent, reliable, and nurturing responses from the caregivers to the child's needs. Through this pattern of responsive sensitivity, securely attached children learn to depend on their caregivers for reassurance. This, in turn, promotes two essential protective factors for depressive vulnerability: high levels of

self-worthiness and a core relational belief that relationships are safe and reliable (Doyle & Cicchetti, 2017; Bifulco et al., 2002).

On the contrary, insecure attachments stem from a lack of responsiveness, inconsistency, and unavailability of caregivers to respond to their child's needs (Doyle & Cicchetti, 2017). These can be classified as anxious, avoidant, and a combination of both, disorganized (Ainsworth et al., 2015). The anxious attachment style is identified by low avoidance and high anxiety, which equates to a fear of abandonment and rejection by others. It takes its roots in low self-worth and high dependability on others for emotional stability (Zheng et al., 2020). When an anxiously attached individual's relational pattern is activated during emotional stressors, the individual will use hyperactivating emotional regulation strategies. These include rumination, clinginess, persistent help-seeking from others, and oversharing one's distress (Mikulincer & Shaver, 2003; Zheng et al., 2020). The avoidant attachment style is classified by high avoidance and low anxiety. It is marked by fear of intimacy and avoidance of emotional closeness (Brennan et al., 1998). When this attachment pattern is triggered, deactivating emotional strategies like suppressing or numbing one's feelings and exhibiting excessive self-reliance are used to cope with the stressors (Mikulincer & Shaver, 2003; Zheng et al., 2020). Finally, the disorganized style reflects higher levels of neglect and is often the result of adverse childhood experiences (ACEs) (Cicchetti & Barnett, 1991; Rholes et al., 2016). It is identified by high anxiety and high avoidance. According to a study by Van Ijzendoorn et al. (1999), approximately 19% of infants were placed in the disorganized category during the Strange Situation experiment. They argued that the disorganized style co-occurs with organized attachment styles and behaviors. Often, disorganized behaviors will be observed only briefly within a pattern of behaviors that would be classified as organized.

Consequently, a secondary organized attachment can be attributed to an infant classified as disorganized to provide a clearer picture of the infant's attachment style. As indicated by their meta-analysis, secondary category classifications were as follows: 46% are anxious, 36% are avoidant, and 18% are secure (Van Ijzendoorn et al., 1999). These findings were not limited to infants but extended to other age groups. A meta-analysis of early childhood attachment research included studies that merged the disorganized style into one of the organized categories. They found that the effect size was significantly larger than when the disorganized style was viewed as a separate category (Madigan et al., 2013). Thus, it is underlying that perhaps disorganization is not an attachment profile. Instead, it may be a transient change of the usually organized strategy displayed when confronted with distress in caregiver interactions (Madigan et al., 2013). As for adult studies, those who were classified as disorganized reported displaying both avoidant and anxious emotional coping strategies, further reflecting the influence of the underlying secondary organized attachment (Mikulincer & Shaver, 2003; Paetzold et al., 2015).

Internal Working Model and Depressive Symptoms

Given that the IWM shapes thoughts and beliefs, individuals with an insecure attachment are more likely to have predisposing risk factors for MDD (Lopez & Fons‑Scheyd, 2008; Haaga et al., 2002). There is evidence that insecurely attached adults, compared to securely attached counterparts, display lower levels of conflict management and constructive thinking (Lopez, 1996), maladaptive affect regulation strategies (Fuendeling, 1998), decreased tolerance for uncertainty and ambiguity (Mikulincer, 1997), low self-esteem (McCarthy, 1999) and higher levels of depression (Roberts et al., 1996). Studies investigating the connection between student depression and attachment styles, have shown that both anxious and avoidant attachment styles predict depressive symptoms, even after accounting

for initial depression levels (Hankin et al., 2005). Additionally, differences in emotional self-regulation mediated the link between insecure attachment and depression (Wei et al., 2005). In the case of hyperactivating emotional-regulation strategies (e.g., rumination), there is evidence for its connection with the dysregulation of emotion as a mediator of anxious attachment and depressive symptoms. Regarding deactivating emotional strategies as a mediator of avoidant attachment and depressive symptoms, the results are mixed (Wei et al., 2005). Usually, differences in the relationship between the avoidant or anxious style and MDD depend on the specific aspects of depression and the clinical subtype of the population being studied (Mikulincer & Shaver, 2010).

Blatt (1974) differentiated two types of depression based on the insecure styles. The anxious profile is typically associated with anaclitic depression. Meaning it relates to interpersonal aspects of depression, such as neediness, overdependence, and lack of autonomy. In contrast, the avoidant style is associated with introjective depression. This type is based on achievement-related aspects such as self-criticism, self-punishment, and perfectionism. Therefore, AT can provide a comprehensive approach to the genesis and maintenance of depressive symptoms.

Sleep & Attachment Styles

Attachment styles have a significant and long-lasting influence on an individual's emotional, cognitive, and interpersonal blueprint, modulating the stress response (Diamond, 2001; Bowlby, 1988), psychological health (Mikulincer & Shaver, 2012), and social functioning (Hankin et al., 2005). Additionally, the effect of attachment encompasses other biopsychosocial phenomena beyond interpersonal and cognitive factors, such as sleep regulation (Liu et al., 2020). Studies investigating the relationship between attachment styles and sleep, focusing on their impact on sleep quality and pattern, have concluded with mixed

findings. Consistent evidence shows that adults with an insecure attachment display poorer sleep quality than securely attached individuals (Liu et al., 2020; Scharfe & Eldredge, 2001; Carmichael & Reis, 2005). Additionally, research points to the evidence that insecurely attached individuals have more nightmares and nightmare distress than the secure style. Within the insecure styles, the anxious profile has significantly shown the highest frequency of nightmares and associated distress (Belfiore & Pietrowsky, 2017; Reed & Rufino, 2019). Concerning university student samples, to our knowledge, only two studies have focused on this population (Scharfe & Eldredge, 2001; Arsiwalla, 2017). Arsiwalla's (2017) findings were in line with previous literature that insecure attachment was correlated with poor sleep patterns as opposed to their securely attached counterparts. More specifically, this was indicated by negative perception of sleep quality, sleep-wake problems, and the number of wake episodes and their duration. Moreover, in this study, anxiously attached individuals exhibited additional sleep-related difficulties, such as increased sleep-wake problems compared to the avoidant type and longer sleep latency than the secure type. Consistent with prior research (Carmichael & Reis, 2005; Sloan et al., 2007), Arsiwalla (2017) uncovered that the secure style had fewer wake episodes than the avoidant and anxious style and that higher levels of anxiety were linked to higher probabilities of sleep disruptions.

Ranging from insomnia to hypersomnia, the occurrence of sleep disruption is a crucial symptom of MDD (Dagan et al., 2018). As such, additional investigation to better understand its mechanism is essential. Attachment theory can provide a viable avenue of exploration. Following the theoretical model of AT, insecure attachment is directly associated with emotion dysregulation and ineffective emotion regulation strategies. This dysregulated affect and emotion regulation increases the likelihood of sleep disturbances, jeopardizing physical and mental health (Arsiwalla, 2017). Based on the review of Malik et al. (2015) and

Arsiwalla's study (2017), the connection between attachment profiles and health is partially mediated by emotion regulation. For reasons stated previously, students are a valuable population to examine since early adulthood and academic stress can be a vulnerable time for the onset or aggravation of a psychiatric condition.

Present Research

An outlook on university students' psychological and physiological state can give a valuable and realistic glimpse into the connection between MDD, sleep and attachment styles. The aim of this prospective multicohort study is to investigate two relationships, between attachment styles and depression, and attachment styles and sleep. To do so, we tackle two main research questions. First, what is the prevalence of each attachment style - secure, anxious, avoidant, and disorganized - within four different MDD groups? Second, are attachment styles significantly related to sleep patterns and satisfaction?

To gain a better understanding of the link between depressive symptoms and the participant's attachment style, participants have been classified into four groups based on their past and current MDD symptoms. The current symptoms are based on a two-week time frame, and the past symptoms incorporate any MDD diagnosis within one's lifetime. The groups are classified as Absence (no past nor current symptoms), Onset (first-time current depressive symptoms, Recovered (no current symptoms but past occurrence of symptoms), and Chronic (past and current symptoms). Hypotheses, based on the previous literature, are as follows:

- H1.1: a significant positive relationship between the anxious style and chronic group.
- H1.2: a higher distribution of the anxious style in the onset group compared to the recovered group.

- H1.3: a significant positive relationship between the secure style and the absence group.

- H1.4: a higher prevalence of the secure style in the recovered group than in the onset and chronic groups.

Considering the importance of sleep, this study investigates whether attachment styles play a significant role in sleep satisfaction and patterns. Building upon previous literature, the hypotheses are :

- H2.1: higher rates of sleep satisfaction, and H2.2: lower rates of sleep problems for the secure style compared to the insecure styles.

- H2.3: longer sleep latency for the anxious style compared to the other styles.

- H2.4: higher rates of sleep-wake episodes for the anxious style compared to the other styles.

Methods

Design

This study is a prospective case-control design based on the data gathered by the WARN-D research project. Funded by the European Research Council, WARN-D's objective is to act as a depression "forecast" by inferring individual expressions in depressive symptoms and providing a personalized prediction. To do so, the project followed university students for two years using a multicohort design (Fried et al., 2023) with multiple collection stages. The data for this study is solely based on the first stage, a cross-sectional baseline assessment. For more information about the complete study process, refer to the protocol paper (Fried et al., 2023). The Leiden University Research Ethics Committee approved the data collection on the 6th of September 2021 (V2-3406).

Participants

Sample

The sample included 444 participants aged 18-30 (mean = 22.2, SD = 2.7). There were 84.6% (N = 376) female and 15.3% (N = 68) male students. Regarding the education level, 47.5% (N= 211) had an academic university degree, 39.6% (N = 176) had completed pre-vocational secondary education, 7 % (N = 31) had a secondary vocational diploma, 4.3% (N = 19) had finished higher vocational education and 1.6 % (N = 7) were unsure about their highest educational achievement.

Inclusion and Exclusion Criteria

The eligibility requirements stipulated that participants had to (1) be minimum 18 years old, (2) be fluent in reading Dutch or English, (3) study at a Dutch higher educational institution (MBO, HBO, or WO), (4) live in the Netherlands, Germany or Belgium, (5) possess a European bank account and (6) own a smartphone running Android or iOS. Concerning the exclusion criteria, participants with the following characteristics were not retained : (1) PhD students, (2) having a current diagnosis, being in treatment or waiting to be in treatment for major depressive disorder (MDD), mania or bipolar disorder, schizophrenia, psychosis or thought disorder, primary substance use disorder, moderate to severe suicidal ideation and (3) feeling stressed about having access to an estimate of one's daily calories count. Participants were screened for exclusion criteria using self-report assessments operationalizing specific items from the 2-item and 9-item Patient Health Questionnaire (PHQ-2, PHQ-9) (Kroenke & Spitzer, 2013), Altman Self-Rating Mania Scale (Altman et al., 1997), "DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure—Adult" (Narrow et al., 2013), Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) and Beck Scale for Suicide Ideation (Beck et al., 1979).

Procedure

      The study was advertised online and offline, using multiple recruitment methods, such as word-of-mouth, posters, social media, and email newsletters. Further recruitment was achieved by collaborating with several educational establishments (e.g., Caring Universities, MBO Rijnland).

      Potential participants had to complete an online survey in which their preferred language (Dutch or English) and inclusion/exclusion criteria were assessed. According to Leiden University's policies, the survey was finalized by informed consent. Depending on their eligibility, participants were invited to the first stage of the study.

      Selected participants completed a 75-minute Qualtrics survey about physical and mental health, daily life hygiene, and past medical history. More precisely, participants were assessed on (1) their self-rated MDD symptoms in the last two weeks, (2) past MDD diagnosis during their lifetime, (3) their attachment style, (4) their sleep problems (e.g., nightmares) in the last three months and (5) their sleep satisfaction in the last three months.

      Participation in the baseline questionnaire was compensated with 7.50 euros. Participants received supplementary monetary compensation based on their participation level and stage completion.

Measures

MDD diagnosis and symptoms

      Past MDD diagnoses were assessed according to DSM-V criteria using the Lifetime Depression Assessment Self-Report (LIDAS). It is a reliable and valid tool for determining lifetime MDD status (Bot et al., 2017).

      Due to the exclusion criteria, only participants with current MDD symptoms who scored below the moderate level were retained. Participants falling into the Onset and

Chronic groups will show only mild symptoms. This was assessed by using the 2-item Patient Health Questionnaire (PHQ-2) with a score of ≥ 2 (Kroenke et al., 2003) and the 9-item Patient Health Questionnaire (PHQ-9) via a score of ≥ 14 (Kroenke & Spitzer, 2013). MDD groups - Absence, Onset, Recovered, and Chronic - were created by summing scores of the PHQ-9 and LIDAS for each participant. Participants with low scores on both the LIDAS and PHQ-9 were categorized in the Absence group. Participants with high scores on both the LIDAS and PHQ-9 were categorized in the Chronic group.

Attachment Styles

The participant's attachment style was assessed using the Relationships Questionnaire (RQ) (Bartholomew & Horowitz, 1991), which is a 4-item self-rating questionnaire describing each attachment style categorized as A, B, C, and D (secure, disorganized, anxious, and avoidant). For instance, type A was the secure style and defined as: "It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don't worry about being alone or having others not accept me". The RQ consists of two parts: during RQ1, participants pick one item they identify with the most, then in RQ2, participants rate themselves on each item using a 5-point Likert scale (1 = strongly disagree; 2 = somewhat disagree; 3 = neutral/mixed; 4 = somewhat agree; 5 = strongly agree).

The analysis of both RQ parts would be out of scope for this study, as such solely RQ1 scores were used. A correlation matrix of each attachment item was performed to reveal potential intercorrelation between items.

Sleep satisfaction, problems, and latency

Using a 7-point Likert scale (1 = very poor to 7 = very good), sleep satisfaction was measured with the question: "How satisfied are you with your sleep in the last three months (that is, how much and how well you slept)?".

Sleep problems in the last three months were rated on a 5-point Likert scale. (1 = none, 2 = mild, 3 = moderate, 4 = severe, 5 = very severe) and measured with four statements: 1. "I had problems falling asleep.", 2: "I had problems staying asleep.", 3: "I had problems with waking up too early.", 4."I had problems with bad dreams.".

The sleep latency was investigated by asking: "During the past three months, how long (in minutes) has it usually taken you to fall asleep each night?". The participants answered numerically according to an estimation based on minutes, ranging from 0 to 240 minutes.

Statistical Analysis

All statistical testing was done using the IBM SPSS statistical computer package (version 29.0). For the analysis of the MDD groups and attachment styles, due to the categorical nature of the variables being investigated, a non-parametric test was preferred. The dependent variables were the MDD groups (absence, recovered, onset and chronic) and the independent variables the attachment styles (secure, disorganized, anxious and avoidant). The hypotheses were tested using a chi-square of independence applied to a 4x4 contingency table. Prior to conducting the test, assumptions were checked and met to ensure the validity of the analysis. Statistically significant relationships between attachment styles and MDD groups were identified with adjusted residuals above the set threshold of +1.96 and -1.96. Additionally, a Spearman's rho correlation was conducted to further assess the independence of attachment measurement of the RQ items.

All the sleep analyses were performed using a Kruskal-Wallis H test. This non-parametric test was preferred for comparing the multiple groups due to a violation of the assumption of normality. The other assumptions of independence of observations, similar distribution across groups, and homogeneity of variance were met. The sleep satisfaction and sleep problem scores were the dependent variables and the attachment styles were the independent variables. Post-hoc analysis using Dunn's pairwise comparisons with Bonferroni correction was used to assess significant differences between the groups.
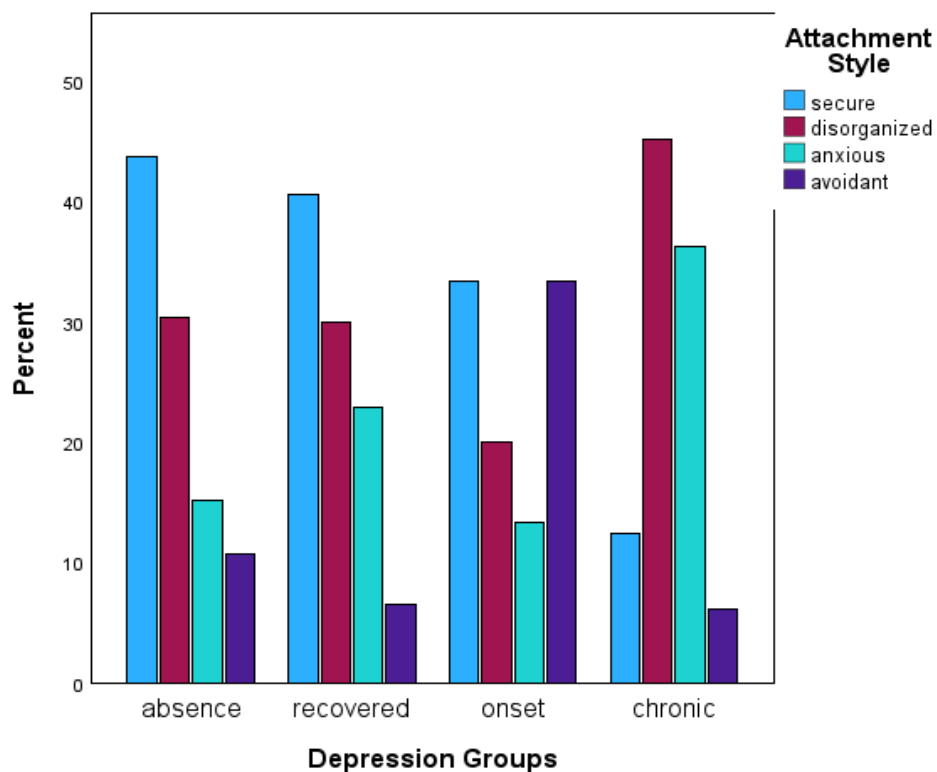
Results

Depression & Attachment Styles

The present study aimed to analyze the distribution of four attachment styles (secure, anxious, avoidant, and disorganized) in specific depression groups (absence, recovered, onset, and chronic) within a student population. The hypotheses regarding the direction and strength of this relationship were as follows : (H1.1) a positive significant relationship between the anxious type and chronic group, (H2.1) a higher distribution of anxious profiles in the onset group compared to the recovered group, (H3.1) a positive significant relationship between the secure profiles and the absence group and (H4.1) a higher distribution of secure profiles in the recovered group compared to the onset group and chronic group.

Figure 1 shows the percentage of each attachment style within the MDD groups. Descriptive statistics in Table 1, including observed counts and adjusted residuals, provide further insight into this distribution and group sizes. A distinction is made between N and n, the former refers to the total population (e.g., the secure style) and the latter refers to the sample population (e.g., sample of the secure style within the recovered group). The strength and direction of the correlation between the four RQ attachment items can be seen in Table 2.

The chi-square test 4x4 tabulation of independence revealed a statistically significant association in the distribution of attachment styles according to their depression groups with a medium effect size (χ2 (9, $N = $ 444) = 52.36, p < .001, Cramer's V = .2).

Figure 1

Distribution of Attachment Styles according to MDD groups

Results in Table 1 show that (H1.1) the anxious style ($N = 105$) was significantly more likely than expected to be part of the chronically depressed group ($N = 113$) ; (H3.1) the secure style ($N = 148$) was significantly more likely to be part of the absence group ($N = 114$) ; and (H4.1) there was a higher distribution of the secure style in the recovered group (n = 80) than in the onset (n = 5) and chronic (n = 14) groups, with a significant positive contribution to the association. A significant negative association between the secure style and the chronic group showed further congruence with these results. Additionally, (H2.1) the anxious profile

was more prominent in the recovered group (n = 45) than in the onset group (n = 2), with no significant contribution for either group.

Finally, we observed four unpredicted results. First, the MDD groups showed an important size variation (e.g., $N = 202$ in the recovered group compared to $N = 15$ in the onset group). Second, the disorganized style had the second highest distribution in the absence group (n = 36) followed by the anxious group (n = 17) with a significant negative contribution. Third, the avoidant profile ($N = 37$) was significantly more likely than expected to be part of the onset group (adj. R = 3.6). Fourth, the disorganized profile showed a positively significant association with the chronic group (adj. R = 2.7) and was the most prominent in this group (n = 51).

Table 1

Observed counts and adjusted residuals of the Attachment Styles according to the MDD groups

Depression Groups	Attachment Styles								Total
	Secure		Disorganized		Anxious		Avoidant		
	n	adj.R	n	adj.R	n	adj.R	n	adj.R	Total
Absence	49	2.5*	36	-.8	17	-2.5*	12	1	114
Recovered	80	2.6*	64	-1.2	45	-.6	13	-1.3	202
Onset	5	0	3	-1.2	2	-1	5	3.6*	15
Chronic	14	-5.5*	51	2.7*	41	3.7*	7	-1	113
Total	148		104		105		37		444

Note. *Adjusted residuals above the significance threshold are with an asterisk.

Table 2

Means, standard deviations, and correlations with confidence intervals of the RQ's

attachment style descriptions

Variable	*M*	*SD*	1	2	3
1. Secure	3.44	1.28			
2. Anxious	2.91	1.39	-.055 [-.13, .06]		
3. Avoidant	2.49	1.27	-.217** [-.31, -.13]	-.284** [-.37, -.19]	
4. Disorganized	3.17	1.44	-.538** [-.59, -.45]	-.109* [-.19, -.01]	.089 [.00, .19]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation.

* indicates *p* < .05. ** indicates *p* < .01.

Sleep Patterns & Attachment Styles

Sleep Satisfaction

The tested hypothesis was that (H2.1) sleep satisfaction scores would be significantly higher for the secure style compared to the insecure profiles. For the statistical analysis, the attachment styles were the independent variables, and the sleep satisfaction scores were the dependent variables.

The test revealed a significant difference between attachment styles and their sleep satisfaction scores (H (3) = 10.75, p = .013). A post-hoc pairwise comparison based on Bonferroni-adjusted p-values indicated that the only significant difference was between the secure and disorganized styles (p = .017). The secure style (M = 4.85) reported more sleep satisfaction than the disorganized style (M = 4.30). The evidence is mixed, and thus, the hypothesis can only be partially supported.

Sleep Problems

The investigated sleep problems were:

- Problem 1: "I had problems falling asleep."

- Problem 2: "I had problems staying asleep."

- Problem 3: "I had problems with waking up too early."

- Problem 4: "I had problems with bad dreams."

Attachment styles were used as the independent variable, and the four sleep problems were the dependent variables for the analysis. The following hypotheses were tested : (H2.2) lower rates of sleep problems for the secure style compared to the insecure styles and (H2.4) higher rates of sleep-wake episodes for the anxious style.

The analyses revealed no significant differences in attachment styles for sleep problems 1 (H (3) = 5, 19, p = .158) and 2 (H (3) = 2.68, p = .442). However, the tests were statistically significant for sleep problems 3 (H (3) = 9,31 p = .025) and 4 (H (3) = 9,49, p = .023). Post-hoc comparisons indicated only one significant difference for sleep problem 4 between the secure and anxious styles (p = .016).

There is mixed evidence to support the prediction that the secure style would have significantly lower rates of sleep problems. Based on the non-significant test result (H (3) = 2.687, p = .442) of sleep problem 2, we can reject the sleep-wake episodes hypothesis, at least in this dataset.

Sleep Latency

The Kruskal-Wallis H test showed no significant difference between the attachment styles in their sleep onset (H (3) = 4.77, p = .189). Therefore, there is no evidence that (H2.3) the anxious group significantly displayed longer sleep latency compared to the other attachment styles.

Discussion

This study explored the link between mental disorders and attachment styles through two main focal points: MDD symptoms and sleep patterns. First, the prevalence of each of the four attachment styles within specific MDD groups, based on current and past symptoms, was assessed to investigate their association. The results showed a statistically significant relationship, in line with previous literature (Haaga et al., 2002; Hankin et al., 2005; Wei et al., 2005; Wei et al., 2005) and in accordance with the predictions that (H1.1) the anxious style was significantly linked to the chronic group, that (H1.3) the secure style was significantly associated with the absence group and that (H1.4) there was a higher distribution of the secure style in the recovered group compared to the onset and chronic group. Second, the potential effect of attachment styles on multiple facets of sleep patterns and satisfaction was tested. A significant effect was found for sleep satisfaction, albeit with a small effect size. The other analyses on sleep problems and latency provided mostly null results.

The following section will discuss the findings of the attachment styles and their MDD group distribution. Then, the results of the sleep analyses will be reviewed. This will be followed by the strengths and limitations of this study, with concluding remarks.

Depression & Attachment Styles

Multiple key findings stood out in the analysis. First, contrary to our hypothesis (H1.2), there was a higher distribution of the anxious style in the recovered group compared to the onset group. This finding can be explained by its small size ($N = 15$), consequently lowering its statistical power. Participants were screened for current MDD symptoms and excluded if they exceeded the predefined threshold, which means that participants in this study were maximum at a moderate level of depressive symptoms. Thus, the pool of

participants falling into the onset category was limited and not reflective of the general population.

The second key finding was the significant positive association of the secure style with the absence group. One interpretation of this result could be that securely attached individuals have a higher recovery rate (Spence & et al., 2022; Ciechanowski et al., 2003; Conradi et al., 2018). Another interpretation could be that some individuals who recovered from MDD might have gone through psychotherapy and effectively tackled some core risk factors linked to their attachment style. Taking into consideration that our sample was primarily female and females are more prone to seeking out psychotherapy, this interpretation could be accurate (Weber et al., 2022). Furthermore, life events have been shown to lead to long-lasting changes in adult attachment styles (Fraley et al., 2021), and priming attachment security effectively reduced attachment anxiety (Hudson & Fraley, 2018).

The third unexpected finding concerned the onset group and its positive significant association with the avoidant style. Introjective depression has an emphasis on self-criticism, perfectionism, and self-punishment. All components could be linked to the academic pressure of student life (Marfoli et al., 2021; Reis & Grenyer, 2002).

The fourth key finding was the unexpected observation of the distribution of this sample's avoidant (8.3%) group. Multiple studies have corroborated the statistically significant difference in attachment styles according to gender: females are more likely to exhibit an anxious attachment, and males are more likely to exhibit an avoidant attachment (Weber et al., 2022; Ciocca & et al., 2020; Del Giudice, 2019, p.1-5). Thus, the small percentage of the avoidant group could be due to the disproportionate female distribution (84.6%) of the sample.

Secondary Organized Style

The fifth key finding was the surprising prominence of the disorganized style (34.7%) in the study. Given that the disorganized style is attributed to confusing, frightening, abusive, and neglectful behaviors from caregivers, it is the least prevalent form of attachment in infancy and child studies (Cicchetti & Barnett, 1991; Van Ijzendoorn et al., 1999). Two possible explanations could account for such an unlikely distribution. In a study evaluating RQ's reliability, the discrepancies in scores between the RQ1 and the RQ2 reached 15.8% (Wongpakaran et al., 2021). More specifically, the secure option showed the highest level of consistency between the two parts, while the disorganized option showed the least. This indicates that the disorganized individuals self-rated highly on other descriptions in RQ2. Although the RQ2 wasn't used in our study, this discrepancy does fit with the second potential reason for this distribution: the theory of a secondary organized style (Van Ijzendoorn et al., 1999). Individuals classified as disorganized show emotional regulating strategies based on either or both the anxious and avoidant styles (Mikulincer & Shaver, 2003; Paetzold et al., 2015; Simpson & Rholes, 2002). This emphasizes the intertwined relationship of the insecure styles and, thus, the necessity to specify a secondary attachment style in the case of the disorganized profile.

Concerning our study, this theory can supply a viable explanation for two other unexpected observations. First, the distribution of the disorganized style (31.6%) in the absence group compared to the anxious style (14.9%), which negatively and significantly contributed to the relationship, might be attributable to a larger proportion of secondary anxious attachment in the disorganized style. Second, in the chronic group, the disorganized style accounted for 45.1%, with a significant positive contribution to the association. The avoidant profile had this group's lowest distribution (6.2%). Although the contribution of the avoidant cell was not significant, such a low distribution is unexpected. Especially regarding

the secure profile (12.4%), which should be the least likely present in the chronic group (Mikulincer & Shaver, 2003). Therefore, this distribution could be explained by the notably smaller size of the avoidant group and the unaccounted-for secondary organized style.

Sleep Patterns & Attachment Styles

Sleep Satisfaction

The sixth key finding concerned the only significant difference in sleep satisfaction between the secure and disorganized styles. This finding partially aligns with our prediction and previous literature stating that insecurely attached individuals have poorer sleep patterns. More specifically, the anxious and disorganized type due to hyperactivating emotional regulation strategies can cause sleep disruptions (Arsiwalla, 2017; Liu et al., 2020; Scharfe & Eldredge, 2001; Carmichael & Reis, 2005). Additionally, if the secondary organized attachment style theory is considered, it could explain the unique significant difference found. The disorganized individuals in this analysis possibly rated the anxious item highly in RQ2. In that case, earlier specification of the secondary organized style would be beneficial for a clearer understanding of the dynamic between insecure attachment styles and sleep satisfaction.

Sleep Problems and Latency

The seventh key finding was the results of the sleep problem analysis, which revealed a single significant result for problem 4 (experiencing bad dreams). The only significant difference in score rates was between the secure and anxious styles. This aligns with existing research that the anxious style is more prone to nightmares (Belfiore & Pietrowsky, 2017; Reed & Rufino, 2019).

The eighth key finding was the nonsignificant results of problem 2, providing no evidence of higher rates of sleep-wake episodes for the anxious style. Although literature linking sleep-wake episodes and insecure attachments has been consistent (Carmichael & Reis, 2005; Sloan et al., 2007; Arsiwalla, 2017).

The ninth final key finding, contrary to prior research and our prediction, was that sleep latency was not statistically different between the secure and insecure styles. Previously cited studies were explicitly focused on investigating sleep. They used multiple measures, such as the Sleep Habits Survey (SHS) and SLEEP-50 Questionnaire or polysomnography scans, to assess sleep disruptions, insomnia, and latency (Arsiwalla, 2017; Sloan et al., 2007). In the case of our study, a lighter focus on sleep investigation during the baseline questionnaire and a lack of additional measures could have contributed to this inconsistent finding.

Strengths

The present study has several strengths. First, the considerable sample size consequently increases the statistical power of the analyses and the generalizability of the findings. Second, multiple studies support the tools used to measure MDD symptoms - LIDAS and PHQ-9 - as valid and reliable measures (Bot et al., 2017; Kroenke & Spitzer, 2013). Using valid and reliable measures is essential for the scientific integrity and replicability of psychological studies.

Limitations

The results of this research should also be viewed in light of several limitations. First, as most studies rely on Western, educated, industrialized, rich, and democratic (WEIRD) samples, the generalizability of the findings is questionable (Henrich et al., 2010).

This subgroup represents only 11% of the world's population (Halmayer et al., 2021), so results should be applied cautiously when investigating other types of samples.

Second, the distribution of the attachment styles might have been skewed by the majority of females in the sample (85.1%). The anxious style has been commonly associated with females, whereas the avoidant style is with males (Weber et al., 2022). This might explain the disbalance in group proportions, notably the avoidant group comprising only 37 individuals compared to approximately 140 individuals for the secure and disorganized group. Balancing the gender proportion in future studies might help to increase the likelihood of equal groups.

Third, the decision to use solely RQ1 for assessing attachment styles went against the advice of prior research (Wongpakaran et al., 2021; Bartholomew & Horowitz, 1991). Inconsistencies between the two parts of RQ are typically observed, and its reliability as a tool depends on the concordance of both parts (Wongpakaran et al., 2021). This raises the question of what to do with participants who are inconsistent between both parts. In the case of the disorganized style in RQ1 with high scores on other items in RQ2, should it be viewed as a secondary organized attachment? This topic deserves further consideration in future work, but it is out of the scope of this thesis, which already covers a larger number of topics.

Fourth, the exclusion criteria for current MDD symptoms were set at a moderate level. Consequently, this considerably impacted the proportion of the MDD groups, especially the onset group, which consisted of 15 individuals compared to approximately 100 individuals for the absence and chronic group. Group equality is essential for the validity and reliability of the findings and should be strived for when accessible.

Fifth, a valuable addition to this study would have been the differentiation between introjective and anaclitic depression. The link between insecure attachment styles and MDD

has been well established. Hence, a more detailed analysis of the specific triggers of MDD symptoms according to the attachment style would have been more revealing.

Sixth, sleep is a complex and difficult process to research. This study only addressed it through self-rating questions. For future research exploring its relationship with attachment styles, a neurobiological evaluation might provide a more in-depth picture.

Conclusions

Beyond the above limitations, this study provides further insight into the attachment literature. The link between MDD and attachment styles has been extensively documented (Haaga et al., 2002; Hankin et al., 2005; Wei et al., 2005; Wei et al., 2005). To our knowledge, the exact distribution of attachment style according to MDD symptoms in students has not yet been investigated. The first important implication of this research is the need to specify the underlying secondary organized attachment style within the disorganized population. Establishing a precise specification will help to best predict the likelihood and internalizing of psychopathologies in this category of individuals.

Furthermore, the implications of these findings can be applied to prevention and treatment. The distinction between the different types of depression - anaclitic and introjective - could be a valuable asset in understanding and targeting the personal context in which MDD symptoms develop. In the case of this student population, the onset group was significantly related to the avoidant style. This could suggest that specific factors linked to the student life might exacerbate introjective depression symptoms, such as tendencies to self-criticize and evaluate, as well as concerns about achievements (Reis & Grenyer, 2002). If this finding is replicated in future studies, universities could offer targeted prevention plans according to the student's attachment style and specific MDD facet. As for treatment purposes, considering the significant rate of the secure style in the recovered group, a focus

on attachment during MDD therapy could add to the durability of the treatment and potentially prevent relapse. There is evidence of the effectiveness of integrating attachment styles within MDD therapy (McBride et al., 2006; Van Der Spek & et al., 2023). Nonetheless, the importance of researching durable, successful treatments for MDD is a priority and should continue to be investigated.

Finally, regarding the relationship with sleep patterns and satisfaction, this study added to the modest body of literature currently available. An interesting avenue of future exploration would be to observe the potential influence of attachment therapy on sleep, further expanding our understanding of core psychobiological processes.

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