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DOI

[10.1016/j.paid.2021.111233](https://doi.org/10.1016/j.paid.2021.111233)

Publication date

2022

Document Version

Final published version

Published in

Personality and Individual Differences

License

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[Link to publication](#)

Citation for published version (APA):

Nottage, M. K., Oei, N. Y. L., Wolters, N., Klein, A., Van der Heijde, C. M., Vonk, P., Wiers, R. W., & Koelen, J. (2022). Loneliness mediates the association between insecure attachment and mental health among university students. *Personality and Individual Differences*, 185, [111233]. <https://doi.org/10.1016/j.paid.2021.111233>

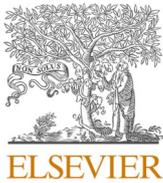
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Loneliness mediates the association between insecure attachment and mental health among university students

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ARTICLE INFO

Keywords:

Attachment
Loneliness
Depression
Alcohol use
University students

ABSTRACT

Insecure attachment is a transdiagnostic personality factor which may confer risk for mental health issues. The mechanisms underlying this association may be partly explained by loneliness. Loneliness, which is common in young adulthood, also concerns social relationships and is similarly associated with negative mental health outcomes. This study investigates whether insecure attachment styles are associated with an increase in mental health issues, specifically depressive symptoms and problematic alcohol use, and whether this link is mediated by loneliness. Students at a Dutch university ($n = 265$) aged 17 to 43 completed an online survey assessing attachment (ECR-SF), loneliness (DJGLS-11), social connectedness (LSNS-6), depression (PHQ-9) and alcohol use (AUDIT-C). Results showed that in individuals with mixed attachment styles (scoring high on both the anxious and avoidant dimensions), loneliness mediated the positive association between attachment style and depressive symptoms. Exploratory moderated mediation, with social connectedness as a moderator, showed that loneliness mediated the attachment-depression relationship in socially connected, anxiously attached young adults. Similar results were found for alcohol use although the direction differed, with lonelier students drinking less. These findings' implications are discussed considering future research and the potential of interventions targeting loneliness from an attachment perspective.

1. Introduction

Attachment theory, initially formulated by John Bowlby (1969), describes how an infant's sense of security is affected by their relationship with their caregiver. These early experiences may carry over into adulthood, determining the perception of later relationships as secure or insecure (Fraley & Shaver, 2000; Roisman et al., 2007). This theory contrasts the secure style with two insecure styles, often referred to as *anxious* and *avoidant* attachment (Bowlby, 1969; Mikulincer & Shaver, 2017). A fourth *mixed* or *fearful* style is sometimes described, characterised by both anxious and avoidant tendencies (Bartholomew, 1990). Growing evidence suggests that insecure attachment has detrimental effects on mental health (Mikulincer & Shaver, 2017), and that it is positively associated with

depressive symptoms (Bifulco et al., 2002; Conradi et al., 2018). Moreover, a large meta-analysis of longitudinal studies by Fairbairn et al. (2018) found that insecure attachment predicted later substance-related problems. While these findings suggest that attachment style is associated with depressive symptoms and problematic alcohol use, little is known about how or why they are linked.

Loneliness, another concept relating to the perception of social relationships, may help explain this link. Insecurely attached individuals report more loneliness than their securely attached counterparts (Bernardon et al., 2011; DiTommaso et al., 2003), although further research is required to determine the specific impact of insecure attachment subtypes. Unsurprisingly, loneliness correlates with depression (Heikkinen & Kauppinen, 2004; Jaremka et al., 2013; Victor & Yang, 2012).

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<https://doi.org/10.1016/j.paid.2021.111233>

Received 12 May 2021; Received in revised form 16 July 2021; Accepted 23 August 2021

Available online 8 September 2021

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Longitudinal data suggest that loneliness is a unique risk factor for the development of depressive symptoms and increased alcohol use (Åkerlind & Hörnquist, 1992; Cacioppo et al., 2006; Qualter et al., 2010; Stickley et al., 2014). Parallels between loneliness and insecure attachment suggest a potential mechanism: insecurely attached individuals may be at increased risk for depressive symptoms and problem drinking because they feel lonelier.

Furthermore, a distinction should be made between loneliness, which results from a person's dissatisfaction with the quality and/or quantity of their relationships, and social connectedness (or isolation), which refers to the objective condition of their social environment (Perلمان & Peplau, 1998). Social connectedness can influence perceived loneliness (De Jong-Gierveld & Van Tilburg, 2006); it might therefore moderate the strength of the relationship between attachment and loneliness. Overall, a better understanding of the direct and indirect mechanisms linking attachment style to mental health outcomes is needed. Such insights may support the development of interventions to prevent or treat related issues, such as depression and problematic alcohol use, while considering attachment- and loneliness-specific challenges.

1.1. Insecure attachment and loneliness in students

Loneliness commonly affects university students, often leading to mental ill-health (Diehl et al., 2018). Indeed, loneliness is most widespread in adolescence and young adulthood (Hawkey & Cacioppo, 2010; Victor & Yang, 2012), with most university students falling within this demographic group. Furthermore, regardless of demographic characteristics, university students are faced with a new social context and pressure to form new relationships (Maunder, Cunliffe, Galvin, Mjali, & Rogers, 2013). While this transitional time is generally conducive to loneliness, its effect may be most pronounced in insecurely attached individuals (DiTommaso et al., 2003; Wiseman et al., 2006).

Attachment may relate to conceptualisations of the self and of others, differently impacting self-esteem and social relationships, and by extension loneliness (Bartholomew, 1990; Mikulincer & Shaver, 2017). According to this theory, securely attached individuals have positive views of themselves and others. In the context of university, a secure student might miss the company of the friends or family left behind. Nonetheless, they might trust that these existing relationships will last, have positive attitudes about forming new relationships and the social skills to do so (DiTommaso et al., 2003). An anxiously attached person however, holding negative views of themselves but positive views of others, might feel very lonely. They might lack the social connections to compensate for their low self-esteem. Individuals with negative views of others (avoidant attachment) may refrain from seeking out new relationships, although it is unclear whether this would result in loneliness in the same way as with anxious attachment. Finally, people with mixed attachment, having negative views of themselves and others, might be at a loss where to seek support. These individuals often have a strong need for closeness (see ECR-SF; Wei et al., 2007) but could become disappointed if others fail to meet these needs. This may lead to loneliness and withdrawal. In sum, attachment style determines how students perceive themselves and others: these perceptions affect how lonely and how socially connected they are. In turn, levels of loneliness and social connectedness may influence how likely a student is to experience mental health complaints.

1.2. The current study

This study aims to investigate whether loneliness mediates the relationship between attachment style and mental health. We hypothesise that loneliness mediates the association between insecure attachment styles and mental health outcomes — specifically depressive symptomatology and problematic alcohol use, common issues among university students (Ibrahim et al., 2013; Karam et al., 2007). In

addition, we will exploratively test whether social connectedness moderates the relationship between attachment style and loneliness.

2. Materials and methods

2.1. Participants and procedures

Undergraduate and graduate students at a Dutch university were recruited starting September 2019. We used data collected before March 2020 to avoid interference from the COVID-19 pandemic and related restrictions. Our sample ($N = 278$) consisted of 74% females ($n = 195$). The mean age was 22.73 ($SD = 3.81$), ranging from 17 to 43. Students were local and international; 147 (56%) completed the survey in Dutch and 118 (45%) in English.

Data was collected as part of a larger study (Klein et al., 2021) with specific inclusion criteria. Students ($n = 22,597$) aged 16+ were emailed an initial survey; 7011 responded. Those who reported mild to severe symptoms of depression (CES-D scores ≥ 16 ; Radloff, 1977) and/or anxiety (GAD-7 scores ≥ 5 ; Spitzer, Kroenke, Williams, & Löwe, 2006) were invited to continue ($n = 5717$). Students who provided informed consent underwent a telephonic interview ($n = 341$). Exclusion criteria were: 1) current or recent manic episodes and/or psychotic symptoms according to the MINI International Neuropsychiatric Interview (Sheehan et al., 1998), and 2) current psychological treatment for depression and/or anxiety. The remaining 312 participants were invited to complete the online survey used in this study, for which no rewards were provided.

2.2. Materials

2.2.1. Attachment style

Attachment style was assessed using an abbreviated version of the Revised Experiences in Close Relationships self-report scale, the ECR-SF (Wei et al., 2007). Six items assess attachment anxiety and 6 assess attachment avoidance, each rated from 1 (strongly disagree) to 7 (strongly agree). In a sample of American students, the ECR-SF yielded Cronbach's alphas (α) of 0.78 for the anxiety subscale and 0.84 for the avoidance subscale (Wei et al., 2007).

2.2.2. Loneliness

Loneliness was assessed using the De Jong Gierveld Loneliness Scale (DJGLS-11; De Jong-Gierveld & Van Tilburg, 2006). This instrument assesses an individual's evaluation of their social environment using 11 items, each rated from 1 (no!) to 5 (yes!) and dichotomised (0–1). De Jong-Gierveld & Van Tilburg's suggested cut-offs are 0–2 (not lonely), 3–8 (moderately lonely), and 9–11 (severely to very severely lonely). The scale authors report a typical reliability of $\alpha = 0.80$ to 0.90.

2.2.3. Depressive symptoms

Depressive symptoms were assessed using the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), a 9-item self-report questionnaire focused on symptoms from the past two-week period, such as mood, sleep, and appetite. Items are rated from 0 (not at all) to 3 (nearly every day), with total scores 0–19. The PHQ-9 is suited for samples at risk for depression, with high specificity (0.94) and a slightly low sensitivity (0.77; Wittkamp et al., 2007).

2.2.4. Alcohol use

Alcohol use was measured using the abbreviated Alcohol Use Disorder Identification Test, the AUDIT-C (Bush et al., 1998). This 3-item instrument assesses quantity and frequency of drinking, and binge-drinking sessions. Items are ranked 0–4, total scores range 0–12. Higher scores indicate more hazardous drinking. The AUDIT-C has been validated in student populations (Verhoog et al., 2020).

Table 1
Variable means, standard deviations, and reliability statistics.

Variable	M	SD	Cronbach's α	
			English	Dutch
ECR-SF				
Anxiety	3.48	1.38	0.83	0.83
Avoidance	3.42	1.28	0.85	0.84
DJGLS-11	5.44	3.51	0.81	0.89
PHQ-9	10.72	5.22	0.84	0.78
AUDIT-C	3.83	2.37	0.71	0.66
LSNS-6	16.13	4.78	0.78	0.78

Note. Cronbach's alphas of 0.70 to 0.90 indicate satisfactory reliability; lower values can be expected for very brief scales like the AUDIT-C (Tavakol & Denck, 2011).

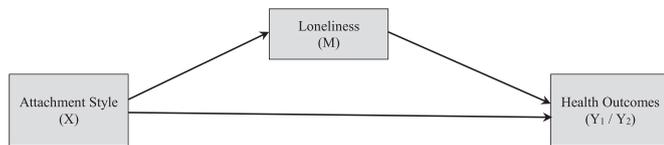


Fig. 1. Simple Mediation Model (Model 4, Hayes, 2018) Note. Conceptual model showing loneliness (M) as a mediator of the association between attachment style (X) and health outcomes (Y1: depressive symptoms and Y2: alcohol use).

2.2.5. Social connectedness

Social connectedness was measured using the Abbreviated Lubben Social Network Scale (LSNS-6; Lubben et al., 2006), a self-report questionnaire evaluating the quality and quantity of social relationships. Three items concern relationships with family members (e.g. “How many relatives do you see or hear from at least once a month?”), and 3 concern relationships with non-family members (e.g. “How many friends do you feel close to such that you could call on them for help?”). Answers range from 0 (none) to 5 (nine or more), and total scores 0–30. Scores ≤ 12 suggest social isolation. The LSNS-6 demonstrated good internal consistency ($\alpha = 0.83$) across European elderly populations (Lubben et al., 2006).

2.3. Data processing and analysis

Data were analysed with IBM SPSS Statistics 26 (IBM, 2019). Descriptive and frequency statistics were computed for all variables (Table 1). Z-scores >3 were considered outliers. Independent samples t-tests were carried out on mean scores of the PHQ-9, AUDIT-C, and DJGLS-11 by gender and language (Appendix, Tables 1 and 2).

Median splits on the two dimensions of the ECR-SF (anxious and avoidant) determined whether an individual scored high or low. Individuals scoring low on both were referred to as *secure*, those scoring high only on avoidance as *avoidant*, those scoring high only on anxiety as *anxious*, and those scoring high on both as *mixed*. Because attachment was operationalised as a multi-categorical antecedent with four categories, it was translated into three indicator variables in the statistical model (Hayes, 2018). The *secure* category was used as reference to create the indicator variables X_1 (*anxious*), X_2 (*avoidant*) and X_3 (*mixed*).

Two mediation analyses were conducted using Process (Hayes, 2018). Dependent variables were depressive symptoms (Y_1) and alcohol use (Y_2), both continuous. We tested whether loneliness (mediator) mediated the relation between attachment style (independent variable) and each dependent variable (process model 4, see Fig. 1). An exploratory moderated mediation analysis (model 7) tested whether social connectedness moderated this indirect relation (Fig. 2). For both models, the *secure* attachment category was used as an indicator variable to be compared with each insecure attachment category. Indirect effects were considered significant when the 95% bootstrap confidence intervals based on 5000 bootstrap samples did not cross zero.

3. Results

Ten duplicate cases were removed. Since cases with missing data were scarce ($n = 3$) they were removed using listwise deletion (Schafer & Graham, 2002). After these exclusions, $n = 265$ remained. One outlier, with a z-score of 3.03 on the AUDIT-C, was found but not excluded. Collinearity tests yielded variance inflation factors lower than 2, indicating that multicollinearity was not an issue (O'Brien, 2007). Median scores for attachment anxiety ($Mdn = 3.33$) and avoidance ($Mdn = 3.50$) resulted in the following categories: *secure* ($n = 86$), *anxious* ($n = 51$), *avoidant* ($n = 41$), and *mixed* ($n = 87$). Half of participants reported moderate loneliness (49%, $n = 131$) and a quarter (23%, $n = 62$) reported severe to very severe loneliness. Twenty two percent were socially isolated ($n = 58$).

3.1. Mediated effect of attachment style on health outcomes

The first mediation analysis showed a significant relative indirect effect (Hayes, 2018): loneliness mediates the association between mixed attachment and depressive symptoms. The test of the direct effect of X on Y_1 was significant (R^2 change 0.029, $D(3, 260)$, $p = .029$), with a significant relative direct effect of mixed attachment on depressive symptoms. No relative direct or indirect effects were found for anxious or avoidant attachment on depressive symptoms (Table 2).

The second mediation analysis also yielded a significant indirect

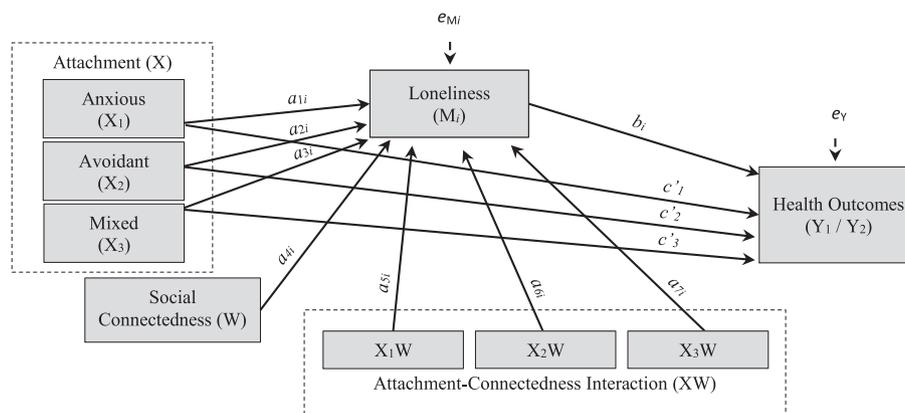


Fig. 2. Moderated Mediation Model (Model 7, Hayes, 2018) Note. Statistical model showing loneliness (M_i) mediating the association between attachment style (X_{1-3}) and health outcomes (Y_1 : depressive symptoms and Y_2 : alcohol use), and social connectedness (W) moderating the association between attachment and loneliness. The conditional indirect effect of X_{1-3} on Y through M_i is $(a(1-3)_i + a(5-7)_i)W$. Direct effects of X_{1-3} on Y are also depicted (c'_{1-3}).

Table 2

Results of the mediation and moderated mediation analyses of attachment on depressive symptoms as a function of loneliness. Effects in bold are statistically significant ($p < .05$ or bootstrapped Confidence Intervals not crossing 0).

		Coeff	SE	t	p	LLCI ^a	ULCI ^a
Mediation effect							
Relative indirect effects ($X \rightarrow M \rightarrow Y$)							
Anx	$a_1 \times b$	0.519	0.313			-0.056	1.173
Avoid	$a_2 \times b$	0.381	0.347			-0.251	1.137
Mix	$a_3 \times b$	1.354	0.365			0.679	2.138
Relative direct effects ($X \rightarrow Y$)							
Anx \rightarrow Dep	c'_1	0.588	0.845	0.696	.487	-1.075	2.252
Avo \rightarrow Dep	c'_2	0.882	0.904	0.975	.331	-0.900	2.662
Mix \rightarrow Dep	c'_3	2.242	0.760	2.950	.004	0.745	3.739
Effect of mediator on DV ($M \rightarrow Y$)							
Lone \rightarrow Dep	b	0.504	0.088	5.743	<.005	0.331	0.677
Moderated mediation effect							
Interaction effects ($X \times W \rightarrow M$)							
Anx	a_5	0.256	0.111	2.315	.021	0.038	0.474
Avoid	a_6	0.107	0.126	0.845	.400	-0.142	0.355
Mix	a_7	0.177	0.096	1.834	.068	-0.013	0.367
Relative conditional indirect effect ($X \times W \rightarrow M \rightarrow Y$)							
Anx	W						
	Low	-0.341	0.427			-1.266	0.396
	Mid	0.434	0.278			-0.097	1.009
	High	0.950	0.354			0.323	1.714
Index of moderated mediation ($X \times W \rightarrow M \rightarrow Y$)							
Anx		0.129	0.054			0.037	0.252
Avo		0.054	0.060			-0.060	0.182
Mix		0.089	0.046			0.004	0.185 ^b

Note. Lettered paths (a_1 , etc.) refer to statistical paths depicted in Fig. 1. X = attachment, Anx = anxious attachment; Avo = avoidant attachment; Mix = mixed attachment; W = social connectedness (Abbreviated Lubben Social Network Scale); M/Lone = loneliness (De Jong Gierveld Loneliness Scale); Y/Dep = depressive symptoms (Patient Health Questionnaire); SE = standard error, LLCI = lower limit confidence interval, ULCI = upper limit confidence interval.

^a 95% confidence intervals computed with bootstrapped percentiles.

^b Mixed attachment yielded a significant index of moderated mediation yet no interaction effect, failing to support an indirect effect (Hayes, 2018).

effect for the mixed attachment group. Mixed attachment was associated with decreased alcohol use via loneliness. The test of the direct effect of X on Y₂ was significant (R^2 change 0.038, $D(3, 260)$, $p = .016$), with a significant relative direct effect of avoidant attachment on alcohol use. No relative direct or indirect effects were found for anxious attachment on alcohol use (Table 3).

3.2. Exploratory moderated mediation analysis

We found a moderated mediation effect of anxious attachment on depression (Table 2). The association between attachment and depressive symptoms runs via loneliness, specifically in individuals with anxious attachment styles who are highly socially connected. No significant indirect effect was found for mixed or avoidant attachment.

Similarly, we found a moderated mediation effect of anxious attachment on alcohol use. The association between anxious attachment and alcohol use runs via loneliness, especially for anxiously attached individuals who are highly socially connected (Table 3). No significant indirect effect was found for mixed or avoidant attachment.

4. Discussion

The aim of this study was to determine whether loneliness mediates the association between insecure attachment styles and common mental health issues (depression and alcohol use) in a university student population. We exploratively tested whether levels of social connectedness influenced the strength of the attachment-loneliness association, and their combined effect on mental health. Overall, the results support direct and indirect associations between attachment style and the investigated outcomes. The direction of the association differed for alcohol use, with lonelier students drinking less.

Results from the simple mediation support a link between mixed attachment and increased depressive symptoms. Part of this association

was direct and part of it could be attributed to loneliness. This suggests that students with mixed attachment styles experience more depressive symptoms than securely attached students, and that this is partly explained by increased loneliness. This is consistent with previous findings indicating that individuals with this attachment style react to separation and loneliness with more distress than securely attached individuals, remain anxious even when in the presence of others, and are likely to show the most severe signs of psychopathology (Mikulincer & Shaver, 2017).

Loneliness also mediated the association between mixed attachment style and alcohol consumption, although the direction of that relationship ran contrary to our hypotheses. Students with mixed attachment styles consumed less alcohol than secure students when they felt lonely. While evidence links loneliness with increased alcohol use (Åkerlind & Hörnquist, 1992; Stickley et al., 2014), there are suggestions that this link may not hold in student populations (Cacioppo et al., 2002). Drinking may be a predominantly social activity in young adults. Feeling lonely may lead students with mixed attachment styles, who hold negative views of themselves and others (Bartholomew, 1990), to retreat from social situations where they would otherwise likely drink. Further studies should compare this mediation model in students and general adult populations.

Exploratory analyses comparing insecure attachment categories to the secure category revealed that the relationship between anxious attachment and depressive symptoms was mediated by loneliness, dependent on the student being well-connected socially. It may be that anxiously attached students, who hold negative views of themselves but positive views of others (Bartholomew, 1990), maintain connections to avoid loneliness. If they still feel lonely despite this, they may feel more depressed.

Socially connected students with anxious attachment styles were less likely to consume alcohol when feeling lonely. We could propose a similar theory as for mixed attachment: anxiously attached students

Table 3

Results of the mediation and moderated mediation analyses of attachment on alcohol use as a function of loneliness. Effects in bold are statistically significant ($p < .05$ or bootstrapped Confidence Intervals not crossing 0).

		Coeff	SE	<i>t</i>	<i>p</i>	LLCI ^a	ULCI ^a
Mediation effect							
Relative indirect effects ($X \rightarrow M \rightarrow Y$)							
Anx	$a_1 \times b$	-0.120	0.091			-0.333	0.013
Avoid	$a_2 \times b$	-0.088	0.087			-0.284	0.059
Mix	$a_3 \times b$	-0.313	0.142			-0.635	-0.067
Relative direct effects ($X \rightarrow Y$)							
Anx → Alco	c'_1	-0.088	0.411	-0.214	.831	-0.898	0.722
Avo → Alco	c'_2	1.278	0.440	2.903	.004	0.411	2.145
Mix → Alco	c'_3	0.455	0.370	1.230	.220	-0.273	1.184
Effect of mediator on DV ($M \rightarrow Y$)							
Lone → Alco	b	-0.117	0.043	-2.728	.007	-0.201	-0.032
Moderated mediation effect							
Interaction effects ($X \times W \rightarrow M$)							
Anx	a_5	0.256	0.111	2.315	.021	0.038	0.474
Avoid	a_6	0.107	0.126	0.845	.400	-0.142	0.355
Mix	a_7	0.177	0.096	1.834	.068	-0.013	0.367
Relative conditional indirect effect ($X \times W \rightarrow M \rightarrow Y$)							
Anx	W						
	Low	0.079	0.105			-0.107	0.323
	Mid	-0.100	0.077			-0.282	0.018
	High	-0.220	0.115			-0.482	-0.036
Index of moderated mediation ($X \times W \rightarrow M \rightarrow Y$)							
Anx		-0.030	0.016			-0.068	-0.004
Avo		-0.012	0.015			-0.045	0.015
Mix		-0.021	0.013			-0.050	-0.000 ^b

Note. Lettered paths (a_1 , etc.) refer to statistical paths depicted in Fig. 1. X = attachment, Anx = anxious attachment; Avo = avoidant attachment; Mix = mixed attachment; W = social connectedness (Abbreviated Lubben Social Network Scale); M/Lone = loneliness (De Jong Gierveld Loneliness Scale); Y/Alco = alcohol use (Abbreviated Alcohol Use Disorder Identification Test); SE = standard error, LLCI = lower limit confidence interval, ULCI = upper limit confidence interval.

^a 95% confidence intervals computed with bootstrapped percentiles.

^b Mixed attachment yielded a significant index of moderated mediation yet no interaction effect, failing to support an indirect effect (Hayes, 2018).

might retreat from social situations when they feel lonely. The effect of this behaviour on alcohol consumption might be most noticeable in well-connected individuals, who would have had more opportunities for social drinking. This is intuitively more unlikely, since anxiously attached individuals are not likely to refrain from contact with others (Bartholomew, 1990; Mikulincer & Shaver, 2017). The dynamics of loneliness may impact these individuals in a unique way, but further study is required to determine specifically how.

Lastly, our analyses revealed a direct link between avoidant attachment and increased alcohol use. The literature does suggest that insecure individuals are at increased risk for harmful substance use (De Rick & Vanheule, 2007; Kassel et al., 2007), however it is unclear why this held for the avoidant subtype only. There is sparse evidence that avoidantly attached individuals might be at higher risk for alcohol use disorders than other insecure subtypes (Vungkhanching et al., 2004); further investigation is needed to confirm this association and determine its mechanisms. Clinically, this may be relevant to identify the potential of avoidantly attached individuals for non-social, 'silent' drinking.

4.1. Study limitations

These findings should be interpreted in light of limitations. First, the cross-sectional design limits causal inferences. We cannot rule out the possibility that the associations run in different directions from the ones we modelled: loneliness may deteriorate attachment, and depressive symptoms may increase loneliness. While unlikely (since attachment is considered a stable trait-like characteristic) this should be ruled out in further studies, accounting for possible confounders and using longitudinal data (Rohrer, 2018). Secondly, selection bias is likely in this self-selected and pre-screened sample. Rates of depressive complaints were above average, with 89% ($n = 235$) of participants reporting mild to severe symptoms (scores 5–19; Kroenke et al., 2001). On the other hand,

11% ($n = 29$) met criteria for harmful alcohol use (scores ≥ 7 for women and ≥ 8 for men), a lower rate than the general prevalence in Dutch student populations (Verhoog et al., 2020). Replication using a random general population sample would be necessary to obtain generalisable results. Furthermore, we detected associations between gender, language, and alcohol use. With adequate power, separate analyses by subgroups (gender, language, and local/international) may yield further insights. Finally, there are limitations to the instruments and constructs used in this study. For example, the LSNS-6 has only been validated for elderly populations. Self-report measures are susceptible to social desirability and recall biases (Arnold & Feldman, 2017). Lastly, we used attachment categories to run moderated mediation analyses using Process. Attachment categories have limitations and a dimensional approach to attachment is generally preferable (Mikulincer & Shaver, 2017).

5. Conclusions

Results support the hypothesised mediation models of the relationship between attachment and mental health, as well as offering some initial insights into the role of social connectedness. While these findings are preliminary, they highlight a possible approach to understanding and addressing loneliness, particularly in students. In adjusting to college and university life, anxiously attached individuals are faced with challenges which may be unique to their personality dynamics. Indeed, our findings resonate with other studies, indicating that students with specific attachment styles may benefit from specific interventions aimed at reducing loneliness and depression (Wei et al., 2005). Taken together, these combined findings highlight the potential of interventions which target loneliness from an attachment perspective.

CRedit authorship contribution statement

Matilda K. Nottage: Writing – original draft, Data curation, Formal analysis, Visualization. **Nicole Y.L. Oei:** Conceptualization, Methodology, Formal analysis, Visualization, Writing– review and editing, Supervision. **Nine Wolters:** Writing – review & editing. **Anke Klein:** Writing – review & editing. **Claudia M. Van der Heijde:** Writing – review & editing. **Peter Vonk:** Writing – review & editing, Funding acquisition. **Reinout W. Wiers:** Writing – review & editing, Funding acquisition. **Jurrijn Koelen:** Conceptualization, Methodology, Data

curation, Writing – review & editing, Supervision.

Acknowledgements

We thank Ruben Atteveld, Jorien van Blom, Eline Bol, Lisa de Koning, and Samantha Roetink for their contributions.

Funding

This work was supported by the University of Amsterdam.

Appendix A

Table 1

Independent samples *t*-tests: Language.

Variable	Dutch <i>n</i> = 147		English <i>n</i> = 118		<i>t</i>	<i>df</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Social connectedness	16.50	4.89	15.66	4.62	1.43	256	.155
Loneliness	4.71	3.66	6.36	3.11	−3.97	262	<.005
Attachment avoidance	3.37	1.18	3.49	1.39	−0.81	231	.422
Attachment anxiety	3.26	1.29	3.75	1.44	−2.87	237	<.005
Alcohol	4.06	2.46	3.54	2.24	1.80	259	.074
Depression	10.37	4.82	11.15	5.68	−1.20	230	.233

Table 2

Independent samples *t*-tests: Gender.

Variable	Male <i>n</i> = 66		Female <i>n</i> = 195		<i>t</i>	<i>df</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Social connectedness	16.05	4.76	16.12	4.82	−0.11	113	.909
Loneliness	5.62	3.51	5.37	3.55	0.49	113	.623
Attachment avoidance	3.57	1.20	3.37	1.31	1.11	121	.269
Attachment anxiety	3.41	1.32	3.50	1.41	−0.50	119	.620
Alcohol	4.39	2.46	3.67	2.32	2.09	107	.039
Depression	10.65	5.00	10.60	5.24	0.07	117	.943

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