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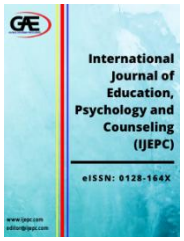

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THE RELATIONSHIP BETWEEN PARENT AND PEER ATTACHMENT, LONELINESS, PERSONALITY, SOCIAL MEDIA, AND TIME SPENT ALONE ON HOBBIES AMONG MALAYSIAN LATE ADOLESCENTS WITH ANXIOUS SELF-PREOCCUPATION

Terence Tan Cheng Xi[1]*, Ng Joo Hou[2]

[1]School of Psychology and Social Sciences, IMU University, Kuala Lumpur, Malaysia
tanterence711@gmail.com https://orcid.org/0009-0009-2031-4000
[2]School of Psychology and Social Sciences, IMU University, Kuala Lumpur, Malaysia
joshua.ng87.jn@gmail.com https://orcid.org/0000-0001-6461-6638
*Corresponding Author

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Abstract:

Background: Social anxiety is prevalent among Malaysian late adolescents. Anxious self-preoccupation (ASP), characterised by heightened self-focused attention in social situations, has been proposed as a cognitive mechanism linking insecure attachment to social anxiety and interpersonal difficulties. However, limited research has examined ASP's relationship with parent and peer attachment and loneliness in the Malaysian context, or the pathways through which these relationships operate. **Objective:** This study examined whether personality traits, social media usage, and time spent alone on hobbies mediate the associations between ASP and relational outcomes (i.e., parent and peer attachment) as well as loneliness. **Methods:** A cross-sectional quantitative design was used. 189 Malaysian late adolescents (aged 18–24) completed self-report measures of ASP, parent and peer attachment, loneliness, personality, social media usage, and time spent alone on hobbies. Mediation analyses were conducted using PROCESS Macro with bootstrapped confidence intervals. **Results:** ASP significantly predicted lower maternal ($\beta = -.33$), paternal ($\beta = -.25$), peer attachment ($\beta = -.23$), and higher loneliness ($\beta = .51$). Extraversion and conscientiousness fully mediated the ASP–maternal attachment relationship; extraversion partially mediated the ASP–paternal attachment relationship; and neuroticism partially mediated the ASP–loneliness relationship. None of the tested mediators significantly accounted for the ASP–peer attachment relationship. Social media usage and time spent alone on hobbies did not significantly mediate any

International Journal of Education, Psychology and Counseling
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Volume 11 Issue 62 (March 2026) PP. 1449-1475

of the tested relationships. **Conclusion:** These findings extend Vertue's (2003) attachment-based model of social anxiety to a Malaysian context, suggesting that ASP-related reductions in extraversion and conscientiousness may impair parental relationship quality, while higher neuroticism levels may increase loneliness risk among Malaysian late adolescents. Practitioners working with socially anxious clients should consider prioritising personality-linked emotion regulation. Future longitudinal research using cross-lagged panel models is recommended to examine the directionality of these relationships.

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Keyword:

Anxious Self-Preoccupation, Loneliness, Parent and Peer Attachment, Personality Traits, Social Media Usage

Introduction

Background

During the third wave of the pandemic in late 2020, mild to severe anxiety symptoms were present among 43.5% of Malaysian late adolescents (Marzo et al., 2021). The Malaysian Psychiatric Association (n.d.) stated that social anxiety disorder (SAD) is present in seven out of 100 Malaysians and shows up in 13 out of 100 Malaysians in their lifespan. Social anxiety comprises a fear of social judgement and physiological anxiety symptoms (e.g., heart palpitations, trembling, blushing, and excessive sweating, Ambusaidi et al., 2022). A key component of social anxiety is anxious self-preoccupation (ASP), which is defined as excessive self-focused attention that hinders social interactions (Vertue, 2003).

Vertue (2003) proposed the construct of ASP, an equivalent to Ingram's (1990) self-absorption, as an integration of internal working models from Bowlby's (1982) Attachment Theory with social anxiety. The author defined ASP as frequent, intense, and prolonged self-focused attention that hinders social interactions. Self-focused attention is the awareness of self-referent information that is created by the self, including bodily sensations, thoughts, emotions, and memories of past emotions and behavior (Baumeister & Tice, 1990; Ingram, 1990). Vertue (2003) placed emphasis on the self-focused attention present in ASP being directed to negative internal working models. Internal working models contain one's perceptions about their social ability, self-worth, and availability of others in varying degrees of positivity (Bowlby's, 1982). Negative models of the self are linked to anxiety towards social interactions and a strong desire for intimacy; negative models of others are linked to social withdrawal and a strong desire for independence (Vertue, 2003). Although internal working models are thought to be stable throughout childhood to late adolescence, they become more complex as an individual

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475
develops cognitively and forms friendships through their teenage years (Pietromonaco & Feldman Barrett, 2000; Thompson et al., 2022). This understanding is in line with Erikson's (1994) postulation that an individual's self-identity, which includes perceptions of the self, goes through multiple reformations during late adolescence (i.e., age 18 to 24) and adulthood after its first formation in adolescence.

Malaysian late adolescents face certain social stressors that may contribute to the formation and maintenance of negative internal working models. Negative internal working models are formed through unfavourable early interactions with others and are reinforced through negative experiences of social situations (Vertue, 2003). In Malaysians' adolescence, their exposure to Malaysia's prevalent shame-based culture may increase their risk of forming negative internal working models of themselves and others (Abdollahi et al., 2022; Vertue, 2003). Besides, during late adolescence, high parental expectations towards their academic performance and pressure to achieve a good tertiary education may reinforce their negative internal working models (Rusli et al., 2023; Yusoff, 2010). Furthermore, societal conditions such as bullying victimization and violence in schools, racial discrimination, and mental health stigmatization due to low mental health literacy may also reinforce their negative internal working models (Aminnuddin, 2020; Munawar et al., 2021; Sabramani et al., 2021). Hence, the negative internal working models of Malaysian late adolescents, which were formed during their adolescence, may be reinforced by this country's parenting practices and societal and cultural conditions.

It was originally proposed that ASP is a result of excessive self-focused attention towards negative internal working models, which are developed in adolescence and can be reinforced during late adolescence (Vertue, 2003). It is possible that ASP may, in turn, influence the quality of a late adolescent's current attachment quality, as ASP and social anxiety are known to hinder social interactions (Barnett et al., 2020; Vertue, 2003). Additionally, the social impairments related to higher ASP levels among Malaysian late adolescents may lead to increased loneliness. To the current researcher's knowledge, scarce research has examined the predictive value of ASP towards parent and peer attachment as well as ASP towards loneliness. Therefore, this study aims to address this research gap by examining these relationships, while providing evidence for a preliminary mediational framework that may explain how ASP may predict attachment and loneliness.

Literature Review

Anxious Self-Preoccupation

ASP may be prevalent among Malaysian late adolescents as it may be consistently reinforced by Malaysian norms. Malaysia has a collectivistic culture that uses shame to enforce social norms (Abdollahi et al., 2022). For example, parents and peers use shame to reinforce societally expected behaviours among late adolescents (e.g., suppressing emotions and maintaining group harmony, Abdollahi et al., 2022). When individuals with higher ASP levels perceive difficulties in social interactions, they return to negative internal working models and shift their attention to extensively monitor themselves (e.g., Warnock-Parkes et al., 2020). Hence, when faced with continuous shame from parents or peers, some Malaysian late adolescents may become overly self-focused, ruminating on negative internal working models (Aknouche & Noor, 2014; Vertue, 2003). Therefore, Malaysian late adolescents may be at a higher risk of developing negative internal-working models of themselves and others.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

Parent and Peer Attachment

Past literature has found that social anxiety, and thus ASP, may lead to social impairments (Barnett et al., 2020). Similarly, social anxiety was negatively associated with parent and peer attachment among late adolescents (Chiu et al., 2021; Rodebaugh et al., 2015). Furthermore, Öztürk and colleagues (2020) found that the parent and peer attachment scores were significantly lower in SAD patients than in control patients. These findings may be explained by the fact that ASP in late adolescents may lead to decreased self-disclosure and increased use of safety behaviors like submission to lower their feelings of anxiety (e.g., Warnock-Parkes et al., 2020). Additionally, ASP among Malaysian late adolescents may lead to passivity during social interactions through being less sociable and initiating fewer conversations (Shin & Newman, 2019). Therefore, there is evidence that suggests that ASP among late adolescents may contribute to poorer parent and peer attachments.

Loneliness

Lim and colleagues (2016) found that besides prior loneliness, only social anxiety was able to predict future loneliness. A global survey (Gallup, 2023) found that 14% of Malaysians felt either fairly or very lonely. Throughout late adolescence and into adulthood, individuals who experience social anxiety are at higher risk of being rejected or socially isolated, which increases their risk of loneliness (Cacioppo et al., 2015; O′Day & Heimberg, 2021). Additionally, Eres and colleagues (2021) found that challenges in regulating emotions are uniquely linked to increased feelings of loneliness among individuals experiencing social anxiety in early adulthood. However, there is limited research on the relationship between ASP and loneliness. The excessive self-focus and negative experiences among anxiously self-preoccupied Malaysian late adolescents during social interactions may lead to poorer social functioning (Vertue, 2003). Thus, we hypothesise that ASP may, similar to social anxiety, increase the risk of loneliness during late adolescence.

Personality Traits

To explain the relationships between ASP and attachment as well as ASP and loneliness, we looked at personality traits as a potential mediator. The Big Five personality traits by Costa and McCrae (1992) comprise extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience. It is known that neuroticism and extraversion have a positive and negative association with social anxiety respectively (Costache et al., 2020; Kaplan et al., 2015). Notably, higher neuroticism is common in many emotional disorders while lower extraversion may be more specific to SAD (Costache et al., 2020; Rector et al., 2012). Furthermore, Costache and colleagues (2020; see also Newby et al., 2017) stated that of the Big Five personality traits, only neuroticism and extraversion could independently predict the presence of SAD. On the other hand, findings on the association between social anxiety and the other Big Five personality traits: agreeableness, conscientiousness, and openness to experience are varied and inconclusive (Kaplan et al., 2015). There is evidence that shows that personality traits vary within the short- and long-term among late adolescents (Beckmann et al., 2021; Jones et al., 2021). Moreover, certain personality traits (e.g., extraversion and conscientiousness) are correlated with the quality of parent and peer attachments among adolescents and adults (Lan et al., 2023). Hence, higher ASP levels could lead to varying levels of personality traits, which may affect one's quality of attachments.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

Meanwhile, a meta-analysis by Buecker and colleagues (2020) highlighted the relationship between personality and loneliness across ages. They found that extraversion, agreeableness, conscientiousness, and openness were negatively associated with loneliness, while neuroticism was positively associated with loneliness. They further stated that all traits except for openness were associated with loneliness after controlling for the rest of the traits. Thus, higher ASP levels could predict higher loneliness scores among late adolescents through personality traits.

Social Media Usage

Increased social media usage may be a pathway through which ASP is associated with parent and peer attachment and loneliness. Higher social anxiety levels were found to correlate with increased social media usage, which has become a major component of the social lives of late adolescents (Baltaci, 2019; Erliksson et al., 2020). Erliksson and colleagues (2020) suggested that individuals with higher social anxiety levels may use social media more often as a medium for social interactions, likely due to their tendency to avoid physical social interactions. Joseph and D'Mello (2021) found that social media usage was negatively associated with parent and peer attachment among Indian late adolescents. Additionally, Eichenberg and colleagues (2024) found that social media addiction was associated with insecure attachment styles. Past research has established social media as a compensatory mechanism for poorer quality of attachments (Eichenberg et al., 2024). However, scarce research has considered social media usage as a factor of the quality of adult attachments, with some preliminary research finding mixed results (Harmon, 2024). Increased social media usage among Malaysian late adolescents may influence their perceptions of their relationships and lead to them to deprioritise their real-life relationships (Harmon, 2024). Therefore, we hypothesise that Malaysian late adolescents with ASP may have a higher social media usage, which contributes to a poorer quality of parent and peer attachments.

Similarly, while there is evidence for the association between social media usage and loneliness, the causal direction of this relationship is not fully agreed upon (O′Day & Heimberg, 2021). O′Day and Heimberg (2021) stated that while lonely individuals may use more social media for social interactions, social media usage may also worsen loneliness due to exposing them to more social comparisons. Hence, Malaysian late adolescents with higher ASP may use more social media, which may lead to more loneliness (O′Day & Heimberg, 2021).

Time Spent Alone on Hobbies

According to Zhou and colleagues (2021), satisfying hobbies predict an increase in the quality of life throughout all ages. Hobbies include individual hobbies (i.e., solitary hobbies) or social hobbies (i.e., hobbies that are done with other people, Davis et al., 2014). Social hobbies were found to predict overall wellbeing among late adolescents (Asquith et al., 2022). Additionally, as leisure activities help maintain positive friendships (Stebbins, 2015), spending more time alone on hobbies, and thus less leisure time with friends, may decrease peer attachment quality. We hypothesise that Malaysian late adolescents with ASP may engage more in individual hobbies and may thus be at further risk of loneliness and poorer attachments, particularly peer attachment, as they may have fewer opportunities to socialize. Exploring time spent alone on hobbies may prove valuable as there is scarce literature on its role in the relationship between ASP, parent and peer attachment, and loneliness.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

The Present Study

This study aims to:

1. Investigate the predictive value of ASP towards parent and peer attachment, and loneliness among Malaysian late adolescents.
2. Investigate the mediating role of personality traits towards parent and peer attachment, and loneliness among Malaysian late adolescents.
3. Investigate the mediating role of social media usage towards parent and peer attachment, and loneliness among Malaysian late adolescents.
4. Investigate the mediating role of time spent alone on hobbies towards parent and peer attachment, and loneliness among Malaysian late adolescents.

The study hypotheses are:

1. H_a1: ASP levels will negatively predict parent and peer attachment scores among Malaysian late adolescents.
2. H_a2: ASP levels will positively predict loneliness scores among Malaysian late adolescents.
3. H_a3: Personality traits will mediate the relationship between ASP levels and parent and peer attachment scores among Malaysian late adolescents.
4. H_a4: Personality traits will mediate the relationship between ASP levels and loneliness scores among Malaysian late adolescents.
5. H_a5: Social media usage will mediate the relationship between ASP levels and parent and peer attachment scores among Malaysian late adolescents.
6. H_a6: Social media usage will mediate the relationship between ASP levels and loneliness scores among Malaysian late adolescents.
7. H_a7: Time spent alone on hobbies will mediate the relationship between ASP levels and parent and peer attachment scores among Malaysian late adolescents.
8. H_a8: Time spent alone on hobbies will mediate the relationship between ASP levels and loneliness scores among Malaysian late adolescents.

Conceptual Framework

Figure 1 displays the relationships among ASP, parent and peer attachment, loneliness, personality, social media usage, and time spent alone on hobbies. ASP among Malaysian late adolescents may affect their parent and peer attachment and loneliness scores via the pathways of personality traits, social media usage, and time spent alone on hobbies.

International Journal of Education, Psychology and Counseling
IJEPC
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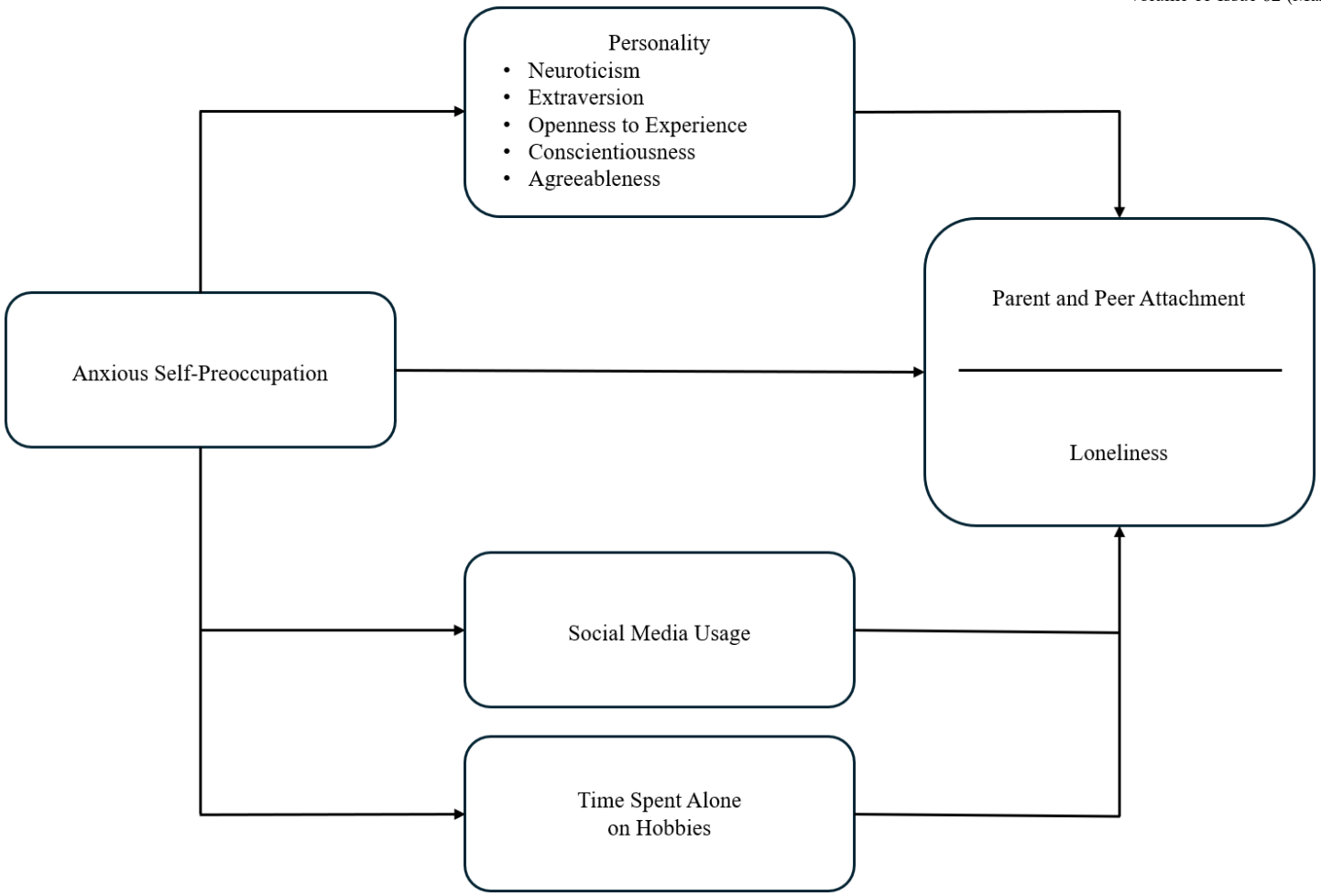

Figure 1 ***Conceptual Framework of the Study***

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

Methods

Research Design

This study has a cross-sectional quantitative survey design that used self-report questionnaires for data collection. The variables that were measured included anxious self-preoccupation (ASP, independent variable), five personality traits (extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience, mediators), social media usage (mediator), time spent alone on hobbies (mediator), parent and peer attachment (dependent variables), and loneliness (dependent variable).

Participants & Sampling Methods

The population of interest was Malaysian late adolescents (aged 18 to 24; Tiwari et al., 2020) who, at that point in time, had non-deceased parents/people acting as their parents. Participants who had one or more clinical mental health diagnoses were excluded.

The target sample size for this study was calculated using the G*Power 3.1.9.7. The statistical test used was linear multiple regression: fixed model, R^2 deviation from zero. As recommended by Memon and colleagues (2020), the effect size was set at 0.15, α at 0.05, and power at 0.95 with nine predictors. G*Power 3.1.9.7 provided a recommended minimum sample size of 166. To account for attrition rates, an extra 10% of the total recommended sample size was recruited to reach the targeted sample size of 183 participants. Volunteer and purposive sampling was used to recruit participants. Participants who were interested in participating were able to access the survey via links that had been posted on social media platforms like Facebook, Instagram, and LinkedIn and complete it at their own accord. 189 participants were recruited. Table 1 presents the demographic characteristics of the sample.

Table 1 Demographic Characteristics of the Sample (n = 189)

Demographic Variable	*n*	*%*	Min.	Max.	*M*	*SD*
Age			18	24	21.56	1.78
Gender						
Female	141	74.6				
Male	48	25.4				
Ethnicity						
Chinese	139	73.5				
Indian	25	13.2				
Malay	21	11.1				
Others	4	2.1				

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

Relationship Status		
Single	141	74.6
In A Romantic Relationship	46	24.3
Married	2	1.1
Studying Status		
Full-Time	173	91.5
Part-Time	1	0.5
Not Studying	15	7.9
Working Status		
Full-Time	14	7.4
Part-Time	27	14.3
Not Working	148	78.3

Materials

Demographic Sheet

This section was designed by the researcher to obtain the demographic data of the participants. It included items on age, gender, ethnicity, nationality, relationship status, study type, and working status. Additional demographic questions include participants' relationship quality with family members, peers, and teachers/boss, who the significant people in the participants' lives are, what the participants' hobbies are, how much time the participants spend on their hobbies daily, and how much time the participants spend alone when engaging in hobbies.

Anxious Self-Preoccupation

The Self-Absorption Scale (SAS, McKenzie & Hoyle, 2008) measures excessive, inflexible, and prolonged self-focused attention, or ASP. The scale consists of 17 items split into two subscales (i.e., private self-absorption and public self-absorption). It uses a five-point Likert scale, ranging from 1 = *does not apply to me* to 5 = *completely applies to me*. A total score is obtained by summing up the scores for the 17 items. A higher total score indicates a higher level of ASP. An example item is "I am very aware of what others think of me, and it bothers me." The SAS showed high internal consistency during the pilot and main studies (Cronbach's alpha = .81 and .88).

Parent and Peer Attachment

The Inventory of Parent and Peer Attachment - Revised (IPPA-R, Armsden & Greenberg, 1989) is the revised version of the original IPPA, which measured maternal and paternal attachments

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

together. The IPPA-R is a self-report scale that was created to measure an individual's perceptions of the emotional and cognitive aspects of their relationships with their parents or peers, including how much these people bring a sense of security. The scale consists of three parts (i.e., mother, father, and peers) with 25 items split into three subscales (i.e., trust, communication, and alienation). It uses a five-point Likert scale, ranging from 1 = *almost never or never true* to 5 = *almost always or always true*. Part I and II are the same, except the word "mother" is substituted for the word "father" in Part II. A total score for one part is obtained for each part by summing up the scores for the 25 items.

A higher total score indicates a higher quality of attachment of an individual to their mother, father, or peers. An example item is "I wish I had a different mother/father." During the pilot study, the Cronbach's alpha values were .75 and for the mother subscale, .60 for the father subscale, and .80 for the peer's subscale. To address the father subscale's reliability issues during the pilot study, item 18 of Part II was removed and items 10 and 17 of Part II were rephrased to increase comprehensibility. The adapted IPPA-R exhibited high internal consistency during the main study (Cronbach's alpha = .81 [mother subscale], .84 [father subscale], and .84 [peers' subscale]). Additionally, an open-ended question "Who are the significant people in your life?" was included to obtain additional information.

Loneliness

The Three-Item Loneliness Scale (TILS, Hughes et al., 2004) is a self-report scale that was created to measure loneliness in large studies. The TILS was developed as a short version of the Revised UCLA Loneliness Scale (Russell et al., 1980). The scale consists of three items (i.e., "How often do you feel that you lack companionship?", "How often do you feel left out?", and "How often do you feel isolated from others?"). It uses a three-point Likert scale, ranging from 1 = *hardly ever* to 3 = *often*. The total score is obtained by summing up the scores for the three items. A higher total score indicates more loneliness in an individual. The TILS showed acceptable to high internal consistency during the pilot and main studies (Cronbach's alpha = .79 and .82). Additionally, an open-ended question "How do you cope with loneliness?" was included to obtain additional information.

Personality

The Mini-International Personality Item Pool (Mini-IPIP, adapted from Donnellan et al., 2006) is a self-report tool that was created to measure the Big Five personality traits (Costa & McCrae, 1992). The Mini-IPIP is a short version of the 50-Item International Personality Item Pool – Five Factor Model (IPIP-FFM, Goldberg, 1992). The scale consists of 20 items split into five subscales with four items each (i.e., neuroticism, extraversion, openness, agreeableness, and conscientiousness). It uses a five-point Likert scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The score for each subscale is treated as an individual variable. The total score for a subscale is obtained by summing up the scores for the items of the specific subscale.

A higher score indicates the individual scores higher on the personality trait. The items in the scale were adapted to include the word "I" in this study for comprehensibility. An example item of the agreeableness subscale is "I feel others' emotions." During our pilot study, the Cronbach's alpha values were .28, .80, .75, .51, and .59 for the neuroticism, extraversion, openness, agreeableness, and conscientiousness subscales. To address these reliability issues,

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

the researchers decided to adapt certain items, which involved providing definitions to less common terms or phrases in parentheses. In the main study, the Cronbach's alpha values were .73, .71, .59, .65, and .57.

Social Media Usage

The Social Media Use Integration Scale (SMUIS, adapted from Jenkins-Guarnieri, 2013) is a self-report scale that was created to measure an individual's active social media usage, attachment to social media, and how much an individual integrates social media into their social lives. The SMUIS was originally created to measure Facebook use, but it was designed to be able to measure many different social networking service platforms. The scale consists of 10 items split into two subscales (i.e., social integration and emotional connection [subscale 1] and integration into social routines [subscale 2]). It uses a five-point Likert scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The total score is obtained by summing up the scores for the 10 items. A higher total score indicates a higher degree of integration of social media into an individual's life. An example item is: "I enjoy checking my social media account(s)." The SMUIS showed high internal consistency during the pilot and main studies (Cronbach's alpha = .88 and .86).

Time Spent Alone on Hobbies

Open-ended questions "What are your hobbies?" and "Which of your hobbies do you spend the most time on?" were included to identify the hobbies the participants primarily engaged with. Additionally, "On average, how much time (in hours) in a day do you spend engaging in hobbies?" and "When engaging in hobbies, how much time (in percentage) do you spend alone?" were included in the demographic sheet to measure how much time the participants spend alone versus with others when engaging in a hobby. Time spent alone on hobbies was measured in percentage and treated as a continuous variable in data analysis.

Procedures

After ethical approval was sought from the JC Ethics Committee of IMU University, a pilot study was conducted among 20 undergraduates from Bachelor's (Hons) in Psychology of IMU University to validate the SMUIS in the Malaysian context, check item quality, and determine the average time taken to complete the survey. Participants signed the Informed Consent Forms and were provided the Participant Information Sheet before completing the online survey. Participants were thanked and debriefed with a service sheet.

Participants were free to withdraw from the study at any time. All data was kept in a password-locked laptop at all times and were only accessed by the researchers. Eligible participants who completed the survey received a RM5 Foodpanda voucher as a token of appreciation through email. Between 6th February to 3rd April 2025, 267 responses were received, 191 of which met the participation criteria. After removing outliers, 189 cases remained.

Data from Microsoft Forms was downloaded and processed (via Microsoft Excel) and imported into SPSS (version 27). Normality of data, outliers, skewness, and kurtosis were checked and correlational analyses were done as preliminary analyses. Parallel mediation analyses were conducted using Hayes' (2017) PROCESS Macro (Model 4) with 5000 bootstrapped confidence intervals, as recommended by Preacher and Hayes (2008).

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

Results

Descriptive Statistics and Correlational Analyses

Table 2 shows the descriptive statistics. The sample had a relatively high mean scores of ASP (M = 46.39), loneliness (M = 5.47), and maternal (M = 81.17), paternal (M = 74.43), and peer attachment (M = 88.59). The sample's peer attachment scores were higher than the parental attachment scores on average. The sample had average mean scores of each personality trait (M ranging from 10.25 to 14.78) and relatively high mean social media usage score (M = 30.46) and time spent alone on hobbies (M = 71.85).

Table 2 Descriptive Statistics (n = 189)

Variable	Min.	Max.	*M*	*SD*
Independent Variable				
Anxious Self-Preoccupation	20.00	76.00	46.39	12.37
Mediators				
Extraversion	4.00	20.00	10.25	3.57
Neuroticism	4.00	20.00	12.40	3.55
Agreeableness	5.00	20.00	14.43	3.06
Conscientiousness	7.00	20.00	14.13	3.12
Openness To Experience	6.00	20.00	14.78	3.08
Social Media Usage	11.00	50.00	30.46	8.22
Time Spent Alone On Hobbies (In Percentage)	0.00	100.00	71.85	31.52
Dependent Variables				
Maternal Attachment	46.00	109.00	81.17	13.17
Paternal Attachment	40.00	104.00	74.43	14.79
Peer Attachment	54.00	125.00	88.59	11.88
Loneliness	3.00	9.00	5.47	1.84

Table 3 shows the zero-order correlations between the variables. ASP was correlated with all variables except for openness to experience and social media usage. ASP had small to moderate positive correlations with neuroticism (r = .54, p < .01), time spent alone on hobbies (r = .18, p = .016), and loneliness (r = .51, p < .01) and small negative correlations with extraversion (r

International Journal of Education, Psychology and Counseling
IJEPC
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Volume 11 Issue 62 (March 2026) PP. 1449-1475

= -.20, $p < .01$), agreeableness ($r = -.27$, $p < .01$), conscientiousness ($r = -.32$, $p < .01$), maternal attachment ($r = -.33$, $p < .01$), paternal attachment ($r = -.25$, $p < .01$), and peer attachment ($r = -.23$, $p < .01$). ASP was not significantly correlated with openness and social media usage.

Maternal attachment was correlated with extraversion ($r = .30$, $p < .01$), neuroticism ($r = -.30$, $p < .01$), agreeableness ($r = .16$, $p = .025$), and conscientiousness ($r = .30$, $p < .01$), but not openness. Paternal attachment was correlated with extraversion ($r = .21$, $p < .01$), neuroticism ($r = -.16$, $p = .026$), conscientiousness ($r = .30$, $p = .021$), but not agreeableness and openness. Peer attachment was only correlated with agreeableness ($r = .22$, $p < .01$). Loneliness was correlated with extraversion ($r = -.26$, $p < .01$), neuroticism ($r = .55$, $p < .01$), agreeableness ($r = -.16$, $p = .034$), and conscientiousness ($r = -.18$, $p = .015$), but not openness.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

Table 3 Zero-Order Correlations (n = 189)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Anxious Self-Preoccupation	-	-.20**	.54**	-.27**	-.32**	-.14	.12	.18*	-.33**	-.25**	-.23**	.51**
2. Extraversion		-	-.23**	.29**	.17*	.02	.16*	-.24**	.30**	.21**	.09	-.26**
3. Neuroticism			-	-.19*	-.21**	-.05	.04	.17*	-.30**	-.16*	-.12	.55**
4. Agreeableness				-	.24**	.38**	.02	-.06	.16*	.11	.22**	-.16*
5. Conscientiousness					-	.27**	-.03	-.18*	.30**	.17*	.10	-.18*
6. Openness To Experience						-	-.11	.08	.05	.06	.13	-.05
7. Social Media Usage							-	-.10	-.03	.06	.13	-.03
8. TSAH								-	-.20**	-.03	-.03	.15*
9. Maternal Attachment									-	.53**	-.03	-.22**
10. Paternal Attachment										-	.06	-.25**
11. Peer Attachment											-	-.20**
12. Loneliness												-

Note. *$p < .05$, **$p < .01$. TSAH = Time Spent Alone On Hobbies.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

Exploratory Mediation Analyses

Of the included mediators, ASP significantly predicted extraversion (b = -.06, p = .006), agreeableness (b = -.07, p < .001), conscientiousness (b = -.08, p < .001), neuroticism (b = .155, p < .001), and time spent alone on hobbies (b = .445, p = .016). Model 1, 2, and 4 were statistically significant. Tables 4, 5, and 6 contain the details of each respective model. All significant indirect effects can be found in Table 7.

Model 1: Anxious Self-Preoccupation and Maternal Attachment

The total effect of ASP on maternal attachment was statistically significant, b = –0.35, SE = 0.07, t(187) = –4.76, p < .001, 95% CI [–0.49, –0.20]. The model accounted for 10.79% of the variance in maternal attachment (R^2 = .11), indicating a small to moderate effect size. The standardised coefficient was β = –.33, suggesting that individuals with higher levels of ASP report lower levels of maternal attachment.

After accounting for mediators, the direct effect of ASP on maternal attachment was no longer statistically significant (b = –0.16, SE = 0.09, p = .070, 95% CI [–0.34, 0.01]), indicating full mediation. The overall model explained 21.38% of the variance in maternal attachment (R^2 = .21), and the standardised coefficient for ASP was β = –.15.

Among the mediators, extraversion (*indirect effect* = –0.04, 95% CI [–0.10, –0.01]) and conscientiousness (*indirect effect* = –0.06, 95% CI [–0.13, –0.01]) were significant mediators. These findings suggest that reduced extraversion and conscientiousness due to higher ASP might lead to lower maternal attachment.

Table 4 Mediation Model 1 (n = 189)

Predictor	*β*	*SE*	*t*	*p*	*LLCI*	*ULCI*
ASP → Maternal Attachment	-.1516	.0884	-1.8260	.0695	-.3358	.0130
ASP → Extraversion	-.2004	.0207	-2.7965	.0057	-.0987	-.0170
ASP → Conscientiousness	-.3210	.0175	-4.6350	.0000	-.1155	-.0465
Extraversion → Maternal Attachment	.2041	.2687	2.8001	.0057	.2222	1.2828
Conscientiousness → Maternal Attachment	.1799	.3095	2.4524	.0151	.1483	1.3698

Note. LLCI = Lower Limit Confidence Interval; ULCI = Upper Limit Confidence Interval.

Model 2: Anxious Self-Preoccupation and Paternal Attachment

The total effect of ASP on paternal attachment was statistically significant, b = –0.29, SE = 0.08, t(187) = –3.48, p < .001, 95% CI [–0.46, –0.13]. The model accounted for 6.07% of the variance in paternal attachment (R^2 = .06), indicating a small effect size. The standardised

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

coefficient was β = –.25, suggesting that individuals with higher levels of ASP report lower levels of paternal attachment.

After accounting for mediators, the direct effect of ASP on paternal attachment remained statistically significant (*b* = –0.24, SE = 0.11, *p* = .025, 95% CI [–0.45, –0.03]), indicating partial mediation. The overall model explained 10.06% of the variance in paternal attachment (R^2 = .10), and the standardised coefficient for ASP was β = –.20.

Among the mediators, only extraversion was a significant mediator (*indirect effect* = –0.04, 95% CI [–0.10, –0.0003]). Notably, when controlling for ASP and the other mediators, extraversion did not significantly predict paternal attachment (*b* = 0.64, *p* = .0501, 95% CI [–0.0004, 1.27]); this is because its indirect effects were only detected after bootstrapping. These findings suggest that extraversion partially explains the effect of ASP on paternal attachment, with a small effect size.

Table 5 Mediation Model 2 (n = 189)

Predictor	*β*	*SE*	*t*	*p*	*LLCI*	*ULCI*
ASP → Paternal Attachment	-.2003	.1062	-2.2567	.0252	-.4492	-.0301
ASP → Extraversion	-.2004	.0207	-2.7965	.0057	-.0987	-.0170
Extraversion → Paternal Attachment	.1538	.3229	1.9720	.0501	-.0004	1.2737

Note. LLCI = Lower Limit Confidence Interval; ULCI = Upper Limit Confidence Interval.

Model 3: Anxious Self-Preoccupation and Peer Attachment

The total effect of ASP on peer attachment was statistically significant, *b* = –0.22, SE = 0.07, *t*(187) = –3.29, *p* = .001, 95% CI [–0.36, –0.09]. The model accounted for 5.46% of the variance in peer attachment (R^2 = .05), indicating a small effect size. The standardised coefficient was β = –.23, suggesting that individuals with higher levels of ASP report lower levels of peer attachment.

After accounting for mediators, the direct effect of ASP on peer attachment remained statistically significant, *b* = –0.22, SE = 0.09, *p* = .012, 95% CI [–0.38, –0.05], indicating no evidence of mediation by the selected variables. The overall model explained 10.69% of the variance in peer attachment (R^2 = .11), and the standardised coefficient for ASP was β = –.23.

None of the mediators had statistically significant indirect effects. However, when controlling for ASP and the other mediators, social media usage significantly predicted peer attachment (*b* = 0.23, *p* = .029, 95% CI [0.02, 0.44]). Overall, the tested mediators did not account for the relationship between ASP and peer attachment.

Model 4: Anxious Self-Preoccupation and Loneliness

The total effect of ASP on loneliness was statistically significant, *b* = .08, SE = .01, *t*(187) = 8.12, *p* < .001, with a 95% confidence interval [.06, .09]. The model accounted for 26.06% of

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

the variance in loneliness (R^2 = .26), indicating a moderate effect size. The standardised coefficient was β = .51, suggesting that individuals with higher levels of ASP report higher levels of loneliness.

After accounting for mediators, the direct effect remained significant (*b* = .05, SE = .01, *p* < .001, 95% CI [.02, .06]), indicating partial mediation. The overall model explained 38.36% of the variance in loneliness (R^2 = .38), and the standardised coefficient for ASP was β = .31. Of all of the mediators assessed, only neuroticism was a significant mediator (*indirect effect* = .03, 95% CI [.02, .04]). These findings suggest that higher levels of ASP leads to increased loneliness in part due to higher neurotic traits.

Table 6 Mediation Model 4 (n = 189)

Predictor	*β*	*SE*	*t*	*p*	*LLCI*	*ULCI*
ASP → Loneliness	.3071	.0109	4.1791	.0000	.0241	.0672
ASP → Neuroticism	.5390	.0177	8.7516	.0000	.1198	.1895
Neuroticism → Loneliness	.3686	.0365	5.2333	.0000	.1190	.2630

Note. LLCI = Lower Limit Confidence Interval; ULCI = Upper Limit Confidence Interval.

Table 7 Indirect Effects for Models 1, 2, and 4 (n = 189)

Pathway	*Effect*	*Boot SE*	*Boot 95% CI*
ASP → Extraversion → Maternal Attachment	-.0436	.0241	[-.0986, -.0062]
ASP → Conscientiousness → Maternal Attachment	-.0615	.0303	[-.1261, -.0080]
ASP → Extraversion → Paternal Attachment	-.0368	.0256	[-.0999, -.0003]
ASP → Neuroticism → Loneliness	.0295	.0065	[.0172, .0426]

Note. Boot SE = Bootstrapped Standard Error; Boot 95% CI = Bootstrapped 95% Confidence Intervals.

Hypothesis Testing

H_a1 and H_a2 were not rejected as ASP levels negatively predicted maternal, paternal, and peer attachment, and loneliness scores. H_a3 was partially rejected as although extraversion and conscientiousness mediated between ASP levels and parent attachment scores, no personality traits mediated between ASP levels and peer attachment scores. H_a4 was not rejected as neuroticism mediated between ASP levels and loneliness scores. H_a5 and H_a6 were rejected as social media usage did not mediate between ASP levels and parent and peer attachment, as well as loneliness scores. H_a7 and H_a8 were rejected as time spent alone on hobbies did not mediate between ASP levels and parent and peer attachment, and loneliness scores.

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475

Discussion

Interpretation of Results

This study found empirical evidence of the role of personality traits (i.e., extraversion, conscientiousness, and neuroticism) in the relationship between ASP and maternal attachment, paternal attachment, and loneliness among Malaysian late adolescents. Among the mediation models, we found evidence for full mediation between ASP and maternal attachment, partial mediation between ASP and paternal attachment, and partial mediation between ASP and loneliness. We did not find evidence for the role of social media usage and time spent alone on hobbies in the relationships between ASP, parent and peer attachments, and loneliness.

Zero-Order Correlations

We found that higher ASP among Malaysian late adolescents was weakly correlated with lower quality of their current parent and peer attachments. This finding supports the understanding that social anxiety worsens social relationship quality (Chen et al., 2023). We also found that higher ASP moderately correlated with loneliness scores, similar to past findings on social anxiety and loneliness (Eres et al., 2021). Perhaps ASP may predispose late adolescents to worse social interactions and more social anxiety, as their self-focused attention may reinforce their negative cognitions (Warnock-Parkes et al., 2020), leading to poorer attachments and more loneliness.

Higher ASP had small to moderate correlations with all personality traits except for openness to experience. Higher ASP was most associated with higher neuroticism, while higher ASP was weakly associated with lower extraversion, supporting previous findings (e.g., Costache et al., 2020). Higher ASP was also weakly associated with lower agreeableness and conscientiousness, while it was not associated with openness to experience. Openness to experience seems to be less associated to ASP and social anxiety compared to the other traits; with the most robust evidence supporting neuroticism and extraversion's association with ASP (Costache et al., 2020).

Higher ASP was not significantly correlated with social media usage. This is contrary to past findings which found social anxiety to be associated with social media addiction (Baltaci, 2019; Erliksson et al., 2020). A possible explanation is that although ASP can be considered a cognitive facet of social anxiety (Vertue, 2003), other facets of social anxiety may be responsible for its association with social media usage. For example, fear of social judgement, an affective characteristic of social anxiety, may be the primary drive behind a socially anxious individual's increased social media usage (O'Day & Heimberg, 2021). And, as ASP does not include the fear of social judgement, higher levels of ASP may not lead to increased social media usage in the same way. Alternatively, past findings which were primarily done in a Western context (e.g., Erliksson et al., 2020) simply may not generalise onto the Malaysian non-clinical population of late adolescents.

Furthermore, higher ASP was weakly correlated with more time spent alone on hobbies. Social anxiety is known to lead to increased social isolation among Western populations (O'Day & Heimberg, 2021). Our finding suggests that ASP levels may have a similar effect, although possibly to a lesser extent, in the Malaysian context. This could be because the Malaysian

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475
emphasis on harmony encourages Malaysian late adolescents to avoid self-isolation, which could be seen as creating conflict (Akaliyski et al., 2025).

Extraversion, neuroticism, agreeableness, and conscientiousness had small to moderate correlations with maternal attachment; while extraversion, neuroticism, and conscientiousness had small to moderate correlations with paternal attachment. The participants' personality traits correlated more with maternal than paternal attachment, similar to previous findings (Tommasi et al., 2024). While it is known that adolescents' personality traits are correlated with their parental attachments (Werneck et al., 2014), the current study's findings suggest that these associations continue into young adulthood. Conversely, among the five personality traits, only agreeableness was weakly correlated with peer attachment. This is in line with findings that suggest that there is the most evidence for the effect of agreeableness, followed by neuroticism, on peer attachments (Harris & Vazire, 2016).

All personality traits, especially higher neuroticism and lower extraversion, except for openness, were associated with more loneliness. These findings are similar to Buecker and colleagues' (2020) meta-analysis findings, which found significant associations between loneliness and all personality traits, except for openness when controlling for all other traits. The authors explained that the small negative association between openness and loneliness found in previous studies are likely due to overlaps with the other personality traits. Thus, our findings suggest that Buecker and colleagues' (2020) statement that lonely individuals have higher neuroticism and lower extraversion, conscientiousness, and agreeableness applies to the Malaysian context.

Anxious Self-Preoccupation and Parent and Peer Attachment

Our findings indicated that lower extraversion and conscientiousness among individuals with higher ASP levels may contribute to lower maternal attachment, while their lower extraversion may contribute to lower paternal attachment. As individuals with higher ASP levels tend to fixate on negative aspects of themselves, they are expected to behave less extravertedly (e.g., being less social and energetic, Cherry, 2025a). Consequently, they may have fewer interactions, positive or otherwise, with their parents which would likely lead to worse maternal and paternal attachments.

Conscientiousness seems to have a special significance to the maternal attachment of those with higher levels of ASP. Past research has found that parents may respond more positively to children with higher conscientiousness, and conscientiousness may be more central to the mother-child relationship as mothers may be more sensitive to their child's personality traits (Tommasi et al., 2024; Werneck et al., 2014). Therefore, as late adolescents with higher ASP levels may be less conscientious (e.g., less organised, considerate, and goal-oriented, Gordon, 2025) due to their excessive self-focused attention, their relationship with their mother may be affected as she may respond to her child more negatively. Overall, our findings suggest that the negative effect of ASP on paternal attachment may be partially explained by extraversion, and its negative effect on maternal attachment may be fully explained by extraversion and conscientiousness.

Conversely, although we found a small total and direct effect of ASP on peer attachment, the mediation model was not significant. It is likely that our model did not adequately capture the pathways between ASP and peer attachments (Hayes, 2009). Perhaps, unlike with their parents,

International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 11 Issue 62 (March 2026) PP. 1449-1475
a Malaysian late adolescent is able to select peer relationships that complement their personality (Bahns et al., 2016). This may possibly explain why personality traits did not adequately capture the mechanisms through which ASP is associated with peer attachment. Hence, there is a need for future research that identifies the specific mechanisms that link ASP to peer attachment.

Anxious Self-Preoccupation and Loneliness

Of all the mediators, only neuroticism significantly mediated between ASP and loneliness, with the model accounting for 38.36% of the variance in loneliness. ASP and neuroticism are known to be risk factors of loneliness (Abdellaoui et al., 2018; Eres et al., 2021). Hence, this finding suggests that individuals with high ASP levels tend to have higher neuroticism (i.e., more worry, emotional volatility, and susceptibility to stress, Guy-Evans, 2025), which further increases their risk of more loneliness.

Although ASP and neuroticism may overlap conceptually, our findings suggest that neuroticism is still a meaningful mediator between ASP and loneliness. Some researchers considered neuroticism to be equivalent to, more broadly, self-preoccupation; supported by their moderate correlation with each other (r = .57, Ikeda et al., 2019; Perrig-Chiello et al., 2008). Relatedly, we found that ASP moderated correlated with neuroticism (r = .54), suggesting that ASP and neuroticism may, similarly, overlap conceptually. Nonetheless, neuroticism contributed meaningful variance in loneliness that was not accounted for by ASP, likely because it includes emotional instability and increased sensitivity to negative affect, which are not directly captured by ASP (Guy-Evans, 2025).

Implications

This study presents evidence that certain personality traits may cross-sectionally mediate between ASP and maternal attachment, paternal attachment, and loneliness among Malaysian late adolescents. Based on our findings, interventions in the psychology and counselling field should focus on training clients with higher ASP levels to regulate their emotions to reduce the severity or risk of loneliness, or vice versa. Additionally, when working with clients with higher ASP, practitioners should consider their lower sociability as a potential factor of their attachment quality.

Building on Vertue's (2003) attachment-based model of social anxiety, we found associations between ASP, parent and peer attachment, and loneliness among Malaysian late adolescents. These findings are consistent with patterns observed in Western populations (Chiu et al., 2021; Eres et al., 2021), suggesting that ASP may function similarly across cultural contexts. Furthermore, we found that ASP did not significantly correlate with social media usage, suggesting that ASP has a weaker relationship with social media usage than social anxiety does (Erliksson et al., 2020). Lastly, our findings provide preliminary evidence for the mediating role of personality traits in the relationship between ASP and maternal attachment, paternal attachment, and loneliness.

Limitations and Recommendations

There are a few limitations present in this study. First, there is a demographic bias towards Chinese participants, full-time students, and females. This could be because the sampling

method used mostly accessed the Chinese student population. Hence, our findings may be less generalisable as our sample may not accurately reflect Malaysia's diverse ethnic population. Second, the current study did not establish causal mediation. As this study uses a cross-sectional design, we did not establish directionality. Thus, it is as viable to consider that the pathway operates in the opposite direction. To address our limitations, cross-lagged panel models, especially those that control for past attachment quality, would be valuable to establish directionality. Besides establishing directionality, future research should explore other pathways through which ASP may contribute to attachment and loneliness outcomes, or vice versa.

Conclusion

To conclude, our cross-sectional exploratory mediational analysis found that extraversion, conscientiousness, and neuroticism mediate the relationship between ASP and maternal attachment, paternal attachment, and loneliness among Malaysian late adolescents. Extraversion and conscientiousness fully mediated the relationship between ASP and maternal attachment; extraversion partially mediated the relationship between ASP and paternal attachment; and neuroticism partially mediated the relationship between ASP and loneliness. Unexpectedly, ASP was not significantly associated with social media usage, and time spent alone during hobbies did not significantly mediate the relationships between ASP, attachment, and loneliness relationships.

This study tested Vertue's (2003) theoretical models in a Malaysian context, providing evidence that ASP relates to attachment and loneliness in a way that is consistent with Western populations. Furthermore, we provided preliminary evidence for personality traits as mediators of the relationship between ASP and maternal attachment, paternal attachment, and loneliness among Malaysian late adolescents. Given that our main limitations are our demographic bias towards Chinese females and cross-sectional design, future research using cross-lagged panel models to examine these relationships over time would prove valuable.

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assured of confidentiality and anonymity. The data collected were used solely for academic purposes.

Author Contribution Statement:

All authors contributed significantly to the development of this manuscript. Terence Tan was responsible for the conceptualization, literature review, methodology, data collection, analysis, interpretation of results, drafting and critical revision of the manuscript. Joo Hou provided the necessary guidance and supervision on all areas throughout the duration of the study. All authors read and approved the final version of the manuscript prior to submission.

International Journal of Education, Psychology and Counseling
IJEPC
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