

Boundary Confusion in AI-Assisted Relationships Among Young Adults in Universities

Alphonse Nkurunziza^{1*}, Sixbert Sangwa², Fidèle Dushimimana³

ABSTRACT

Background: Artificial intelligence (AI) is increasingly integrated into everyday communication, extending beyond functional and academic uses to influence romantic relationships, particularly among university students who are deeply immersed in digital technologies. As AI systems become more emotionally responsive and easily accessible, they play an increasingly significant role in intimate interactions, raising important questions about their psychological and relational consequences. **Purpose:** This study aims to quantitatively examine the relationship between AI-assisted relationship communication and boundary confusion among university students, addressing a critical gap in the existing literature on artificial intelligence and intimate relationships. **Methods:** This quantitative cross-sectional study involved 420 university students (210 females, 210 males) currently engaged in romantic relationships. Participants completed standardized questionnaires measuring AI-Assisted Relationship Communication (AIRCS), Boundary Confusion in AI-Assisted Relationships (BCARS), and attachment anxiety and avoidance using the Experiences in Close Relationships-Revised (ECR-R). Data were analyzed using SPSS 29.0 and AMOS 29.0, applying correlation, regression, and structural equation modeling analyses. **Results:** AI-assisted relationship communication was strongly associated with boundary confusion and emerged as its strongest predictor. Attachment anxiety and avoidance also significantly predicted both AI-assisted communication and boundary confusion. **Conclusion:** The results show that students who frequently use AI for emotional support and relationship communication are more likely to experience confusion about boundaries in their romantic relationships, especially those with insecure attachment styles. While AI can help meet emotional needs, it can also blur the line between human relationships and technology. These findings highlight the importance of teaching students how to use AI responsibly in relationships, developing clear ethical guidelines, and providing targeted support through university counseling services.

Keywords: Artificial intelligence; AI-assisted communication; boundary confusion; attachment styles; romantic relationships; university students.

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1. Introduction

1.1 Background

Artificial intelligence (AI) now operates not only as a productivity tool but increasingly as a *relational infrastructure* that shapes how intimacy is expressed, negotiated, and stabilized. In university contexts, students are especially likely to incorporate AI chatbots and AI-assisted writing into everyday communication, including emotionally salient exchanges, because these systems are accessible, responsive, and linguistically fluent in ways that can feel interpersonally supportive (Al-Zahrani, 2025; Klimova & Pikhart, 2025). This matters philosophically because the meaning of intimacy is not reducible to message content alone; it is constituted through agency,

responsibility, and mutual recognition. When an algorithm becomes a routine intermediary in emotionally consequential dialogue, the relationship is no longer merely “digitally mediated” but structurally reorganized around a third communicative presence whose outputs can be mistaken for relational competence.

Empirically, AI involvement in romance is no longer marginal. Recent U.S. evidence indicates that romantic relationship engagement with AI is sufficiently common among young adults to warrant direct theorization and measurement, rather than being treated as a speculative future scenario (Willoughby et al., 2025). At the same time, scholarship on companion AI stresses that these systems can introduce novel relational risks precisely because they combine personalization, conversational continuity, and

emotionally resonant language in ways that invite users to treat the system as more than an instrument (Malfacini, 2025; Kirk et al., 2025). The central analytic point is not that AI “replaces” partners in a simple substitution model, but that it can *reconfigure* relational expectations by normalizing asymmetrical responsiveness, frictionless reassurance, and the outsourcing of emotionally difficult communicative labor. Such reconfiguration can quietly shift what partners consider reasonable to expect from one another, and it can do so without explicit negotiation.

A particularly relevant explanatory lens is attachment theory, which holds that individuals differ in their tendencies to seek closeness, reassurance, or emotional distance in intimate bonds (Hazan & Shaver, 1987). Although attachment theory was developed for human-to-human relationships, recent work demonstrates that attachment dimensions meaningfully shape human–AI relating, including emotional investment, reliance, and perceived security (Yang & Oshio, 2025). In this frame, AI-assisted relationship communication can be understood as an attachment-regulation tactic: anxiously attached individuals may use AI to intensify reassurance-seeking and reduce uncertainty, while avoidantly attached individuals may use AI to manage relational demands and minimize vulnerability through indirect communication (Yang & Oshio, 2025; Malfacini, 2025). These tendencies are theoretically important because they connect a stable relational disposition (attachment) to a specific behavioral pathway (AI-assisted romantic communication) that can plausibly alter boundary management in the relationship.

This study focuses on a distinct relational outcome: **boundary confusion in AI-assisted relationships**, defined here as a multi-dimensional loss of clarity about (a) *emotional boundaries* (who is responsible for comfort, validation, and soothing), (b) *communicative boundaries* (when AI becomes a substitute for direct partner dialogue), (c) *role boundaries* (whether AI functions as advisor, confidant, or quasi-partner), and (d) *ethical boundaries* (authenticity, transparency, privacy, and emotional dependency). In ordinary romantic life, boundaries are not mere rules; they are the conditions that make trust and mutual accountability possible. When AI enters intimate exchanges without explicit shared norms, the boundary work that couples usually perform through dialogue can be displaced or diluted, increasing the likelihood of ambiguity and conflict. Boundary theory and related work on privacy and digital boundary phenomena underscore that technologies do not simply carry communication; they can reshape how people perceive permissible disclosure, relational access, and interpersonal obligation (Wang et al., 2025).

1.2 Problem Statement

Despite the growing integration of AI into intimate life, the research base remains uneven in two ways that matter for rigorous psychological explanation. First, much of the literature emphasizes motivations, gratifications, or descriptive accounts of AI use, but gives less attention to *measurable relational outcomes* that capture how AI alters the structure of intimacy itself (Suriá-Martínez et al., 2025; Klimova & Pikhart, 2025). Second, although attachment processes in human–AI interaction are increasingly documented, boundary confusion has rarely been modeled quantitatively as a relational consequence of AI-assisted communication in romantic contexts, particularly within higher education populations where developmental vulnerability and high digital immersion converge (Arghode & Nafukho, 2025; Klimova & Pikhart, 2025). As a result, existing scholarship is often not yet positioned to specify *how* and *through what pathways* AI-assisted communication translates into boundary-related difficulties inside ongoing human romantic relationships.

Accordingly, the present study addresses a focused empirical gap: the absence of a theory-driven quantitative model that (1) operationalizes AI-assisted relationship communication as a multi-domain behavioral construct, (2) measures boundary confusion as a multidimensional relational outcome (including ethical boundary tension rather than only emotional ambiguity), and (3) tests whether AI-assisted communication helps explain how attachment insecurity becomes expressed as boundary confusion. Clarifying these pathways is not merely descriptive; it is clinically and institutionally relevant because boundary confusion is a plausible mechanism through which AI involvement can contribute to relational strain, distrust, and reduced communicative competence in student populations.

1.3 Research Objectives

This study pursues three objectives. The first is to examine the association between AI-assisted relationship communication and boundary confusion among university students in romantic relationships. The second is to test whether attachment anxiety and attachment avoidance predict both AI-assisted relationship communication and boundary confusion. The third is to evaluate whether AI-assisted relationship communication functions as a mediating pathway through which attachment anxiety and avoidance are linked to boundary confusion.

1.4 Research Question(s)

Guided by the theoretical framing above, the study addresses three research questions: To what extent is AI-assisted relationship communication associated with boundary confusion in romantic relationships among university students? To what extent do attachment anxiety and attachment avoidance predict AI-assisted relationship

communication and boundary confusion? To what extent does AI-assisted relationship communication mediate the relationship between attachment insecurity (anxiety and avoidance) and boundary confusion?

1.5 Expected Contributions

This study contributes at three levels. Conceptually, it advances a clearer account of boundary confusion as a multidimensional phenomenon in AI-assisted romance, explicitly incorporating ethical boundary tension (authenticity, privacy, and dependency) alongside emotional and role-based ambiguity. Methodologically, it provides structured measurement of AI-assisted relationship communication (AIRCS) and boundary confusion (BCARS) suitable for multivariate modeling in student populations, enabling the estimation of direct and indirect pathways rather than relying on impressionistic description. Theoretically, by integrating attachment theory with boundary-focused reasoning about intimacy under technological mediation, the study clarifies why AI-assisted communication is not a uniform influence: it is likely to interact with attachment-related regulation strategies, thereby producing predictable patterns of boundary confusion that matter for counseling practice, digital wellbeing programming, and the development of ethically attentive guidance for AI use in intimate contexts.

2. Methods and Materials

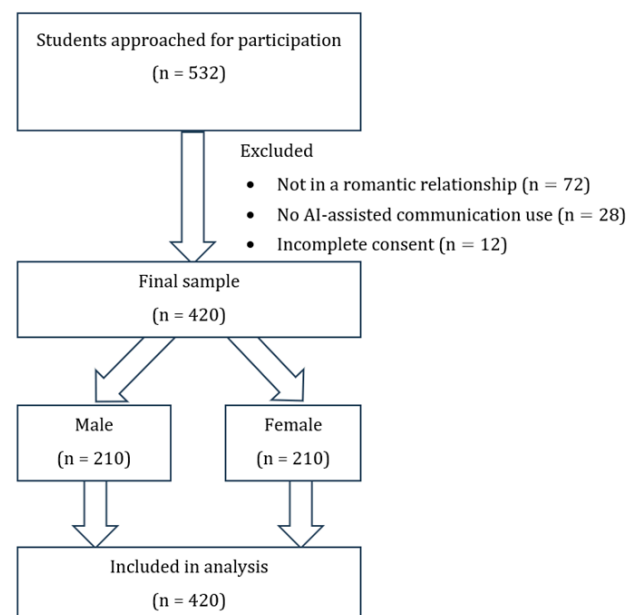
2.1 Study design and procedure

This study employed a quantitative cross-sectional research design to examine boundary confusion in AI-assisted romantic relationships among university students. Data were collected using a structured, self-administered online questionnaire distributed to university students who reported being currently involved in a romantic relationship. Participants were recruited through university mailing lists and student communication platforms. Prior to participation, informed consent was obtained electronically, and respondents were assured of anonymity and confidentiality. The questionnaire assessed demographic characteristics, patterns of AI-assisted relationship communication, and levels of boundary confusion using standardized Likert-type scales. Data collection was conducted over a six-week period, after which responses were screened for completeness and eligibility prior to statistical analysis. This design was appropriate for identifying patterns, associations, and predictive relationships between AI use and boundary confusion within an academic population.

2.2 Participants

Participants in this study were undergraduate and postgraduate university students who were currently involved in a romantic relationship at the time of data collection. Eligibility criteria required participants to be between 18 and 30 years of age, actively enrolled in a university program, and to report prior use of artificial intelligence-based tools (such as chatbots or AI-assisted messaging applications) for communication, emotional support, or relationship-related purposes. Students who were not in a romantic relationship or who reported no experience using AI-assisted communication tools were excluded from the study. The final sample consisted of 420 participants, comprising 210 females (50.0%) and 210 males (50.0%), following data screening for incomplete or invalid responses. Participants were drawn from a range of academic disciplines and levels of study, allowing for diversity in academic background, age, and relationship duration. The sample size was considered sufficient to provide adequate statistical power for quantitative analyses, including multiple regression and structural equation modeling.

Figure 1: Flow diagram of the study participants



2.3 Data Collection and Measurements

Data were collected using standardized, self-administered questionnaires designed to assess AI-assisted relationship communication, boundary confusion, and attachment-related tendencies among university students.

2.3.1 Scale Development and Validation Procedure

The development of the AI-Assisted Relationship Communication Scale (AIRCS) and the Boundary Confusion in AI-Assisted Relationships Scale (BCARS)

followed a multi-stage validation sequence. First, item generation was guided by an extensive review of literature on technology-mediated communication, attachment regulation, boundary theory, and human–AI interaction. Initial item pools were generated to reflect theoretically distinct but related domains of AI involvement in romantic relationships. Second, items were reviewed by two experts in clinical psychology and relationship research to establish content validity, clarity, and conceptual relevance. Items judged to be redundant, ambiguous, or theoretically misaligned were removed or refined. Third, Exploratory Factor Analysis (EFA) was conducted using principal axis factoring with oblique rotation to examine latent dimensionality and inform item retention. Items with factor loadings below .50 or cross-loadings above .30 were excluded. Fourth, Confirmatory Factor Analysis (CFA) was performed within a structural equation modeling framework to validate the factor structure identified in EFA. Model fit was evaluated using standard indices (CFI, TLI, RMSEA, SRMR). Fifth, convergent validity was assessed using Composite Reliability (CR) and Average Variance Extracted (AVE), while discriminant validity was evaluated using the Heterotrait–Monotrait ratio (HTMT). All retained constructs met recommended psychometric thresholds, supporting the adequacy of the measurement models.

2.3.2 AI-Assisted Relationship Communication Scale (AIRCS)

The AI-Assisted Relationship Communication Scale (AIRCS) was developed to assess the extent to which university students use artificial intelligence–based tools in romantic relationship communication. The scale consists of 20 items measuring multiple dimensions of AI use, including emotional expression, reassurance seeking, conflict-related communication, message formulation, and relationship decision-making. Participants rated their agreement with each item on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater reliance on AI-assisted communication in romantic interactions. Grounded in literature on technology-mediated communication and human–AI interaction, the AIRCS demonstrated good internal consistency in the present study, with an overall Cronbach's alpha of $\alpha = .90$ and subscale reliabilities ranging from $\alpha = .84$ to $\alpha = .89$, supporting its suitability for quantitative analysis among university students.

2.3.3 Boundary Confusion in AI-Assisted Relationships Scale (BCARS)

The Boundary Confusion in AI-Assisted Relationships Scale (BCARS) was developed to assess uncertainty and ambiguity surrounding emotional, relational, and ethical boundaries when artificial intelligence is involved in romantic relationships. The scale consists of 16 items measuring four dimensions: emotional boundary blurring,

communicative substitution, relational role ambiguity, and ethical boundary tension related to authenticity, privacy, and emotional dependency. Participants rated each item on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater boundary confusion. Grounded in boundary theory, attachment research, and human–AI interaction literature, the BCARS demonstrated good internal consistency in the present study (overall $\alpha = .88$), with subscale reliabilities ranging from $\alpha = .81$ to $\alpha = .86$.

2.3.4 Experiences in Close Relationships–Revised (ECR-R)

Attachment styles were assessed using the Experiences in Close Relationships–Revised (ECR-R), a widely used and psychometrically validated measure of adult attachment in romantic relationships. The revised version was developed to provide a robust assessment of attachment, capturing two continuous dimensions: attachment anxiety and attachment avoidance (Stark & Hoey, 2021). The ECR-R consists of 36 items, with 18 items assessing attachment anxiety and 18 items assessing attachment avoidance. Attachment anxiety reflects fear of rejection and excessive reassurance seeking, whereas attachment avoidance reflects discomfort with closeness and emotional dependence. Participants rated their agreement with each item on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Previous studies have reported high reliability for the ECR-R ($\alpha = .90$ – $.95$). In the present study, internal consistency was excellent ($\alpha = .92$ for attachment anxiety; $\alpha = .93$ for attachment avoidance), supporting its suitability for this research.

2.4 Statistical Analysis

Data were analyzed using SPSS (version 29.0) and AMOS (version 29.0). Preliminary analyses involved data screening for missing values, outliers, and adherence to assumptions of normality. Descriptive statistics, including means, standard deviations, and frequencies, were computed for all study variables. The internal consistency of the measurement instruments was evaluated using Cronbach's alpha coefficients. Pearson correlation analyses were conducted to examine bivariate relationships among AI-assisted relationship communication, boundary confusion, and attachment anxiety and avoidance. Multiple regression analyses were subsequently performed to assess the predictive effects of AI-assisted relationship communication and attachment dimensions on boundary confusion while controlling for relevant demographic variables. Finally, structural equation modeling (SEM) was employed to test the hypothesized relationships simultaneously and to evaluate overall model fit using standard goodness-of-fit indices, including the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of

Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Statistical significance was set at $p < .05$ for all analyses.

Indirect effects were tested using bias-corrected bootstrapping with 5,000 resamples. Bootstrapped 95% confidence intervals were used to determine the significance of mediation effects. Direct, indirect, and total effects were estimated within the structural equation modeling framework. In both multiple regression analyses and structural equation modeling, age, gender, level of study (undergraduate vs. postgraduate), and relationship duration were included as control variables. These variables were selected based on prior evidence linking demographic and relational characteristics to AI use and relationship processes.

Given that all study variables were collected using self-report measures, potential common-method variance was assessed. First, Harman's single-factor test was conducted using exploratory factor analysis to examine whether a single factor accounted for the majority of variance. Second, a latent common-method factor was included in the structural equation model to evaluate whether controlling for shared method variance substantially altered the structural relationships. These procedures are consistent with recommended practices for assessing common-method bias in cross-sectional survey research.

3. Results

3.1 Demographic characteristics

The demographic characteristics presented in Table 1 indicate a balanced and diverse sample of university students appropriate for examining AI-assisted relationship dynamics. The sample was evenly distributed by gender, with 210 females (50.0%) and 210 males (50.0%), enhancing the robustness of gender-related interpretations. Most participants were aged between 21 and 26 years (65.0%), reflecting a developmental stage in which romantic relationships and digital engagement are particularly salient. The majority of respondents were undergraduate students (70.0%, $n = 294$), while a substantial proportion were postgraduate students (30.0%, $n = 126$), allowing for variability in academic experience.

Relationship duration varied across the sample, with 45.0% ($n = 189$) reporting relationships lasting between one and three years, indicating moderate relational stability, while 26.0% ($n = 109$) reported relationships of less than one year and 29.0% ($n = 122$) reported relationships exceeding three years. Importantly, all participants reported using AI tools in their romantic relationships, with 43.3% ($n = 182$) indicating frequent use and 20.7% ($n = 87$) reporting very frequent use, underscoring the central role of AI-assisted communication in this population and supporting the suitability of the sample for investigating boundary confusion in AI-assisted relationships among university students.

Table 1: Demographic characteristics of the study participants (N = 420)

Variable	Category	n	%
Gender	Female	210	50.0
	Male	210	50.0
Age (years)	18–20	84	20.0
	21–23	147	35.0
	24–26	126	30.0
	27–30	63	15.0
Level of Study	Undergraduate	294	70.0
	Postgraduate	126	30.0
Relationship Duration	Less than 1 year	109	26.0
	1–3 years	189	45.0
	More than 3 years	122	29.0
Use of AI Tools in Relationships	Occasionally	151	36.0
	Frequently	182	43.3
	Very frequently	87	20.7

3.2 Descriptive Profiles of AI Use and Relational Vulnerability

The descriptive statistics presented in Table 2 indicate moderate to high levels of AI involvement in romantic relationships among the participants. Overall, AI-assisted relationship communication (AIRCS) showed a mean score of $M = 3.42$ ($SD = 0.78$) on a five-point scale, suggesting that students frequently rely on AI tools in their relational interactions. Among the AIRCS subdimensions, reassurance seeking ($M = 3.61$, $SD = 0.84$) and emotional expression ($M = 3.55$, $SD = 0.81$) recorded the highest mean scores, indicating that AI is most commonly used for emotional support and validation. Conflict-related communication ($M = 3.28$, $SD = 0.79$) and message formulation ($M = 3.25$, $SD = 0.82$) were also moderately high, reflecting AI's role in managing sensitive or challenging relational exchanges.

Boundary confusion in AI-assisted relationships (BCARS) was reported at a moderate level, with an overall mean of $M = 3.18$ ($SD = 0.74$). Within this construct, emotional boundary blurring ($M = 3.31$, $SD = 0.80$) and ethical

boundary tension ($M = 3.23$, $SD = 0.79$) emerged as the most prominent dimensions, suggesting notable uncertainty regarding emotional roles and ethical considerations when AI is involved in romantic communication. Communicative substitution ($M = 3.06$, $SD = 0.77$) and relational role ambiguity ($M = 3.12$, $SD = 0.76$) also reflected meaningful levels of boundary-related concerns.

With respect to attachment styles, participants reported moderate levels of both attachment anxiety ($M = 3.94$, $SD = 1.21$) and attachment avoidance ($M = 3.67$, $SD = 1.18$) on a seven-point scale, indicating variability in attachment-related tendencies within the sample. All study measures demonstrated strong internal consistency, with Cronbach's alpha values ranging from $\alpha = .81$ to $\alpha = .93$, supporting the reliability of the instruments used. Collectively, these findings suggest that AI-assisted communication is a common feature of romantic relationships among university students and is accompanied by measurable levels of boundary confusion and attachment-related vulnerability, underscoring the relevance of examining their interrelationships in subsequent analyses.

Table 2: Descriptive statistics of study variables (N = 420)

Variable	Possible Range	M	SD	α
AI-Assisted Relationship Communication (AIRCS)	1–5	3.42	0.78	.90
– Emotional Expression (AIRCS-EE)	1–5	3.55	0.81	.86
– Reassurance Seeking (AIRCS-RS)	1–5	3.61	0.84	.89
– Conflict-Related Communication (AIRCS-CC)	1–5	3.28	0.79	.84
– Message Formulation (AIRCS-MF)	1–5	3.25	0.82	.85
Boundary Confusion (BCARS)	1–5	3.18	0.74	.88
– Emotional Boundary Blurring (BCARS-EBB)	1–5	3.31	0.80	.84
– Communicative Substitution (BCARS-CS)	1–5	3.06	0.77	.83
– Relational Role Ambiguity (BCARS-RRA)	1–5	3.12	0.76	.81
– Ethical Boundary Tension (BCARS-EBT)	1–5	3.23	0.79	.86
Attachment Anxiety (ECR-R)	1–7	3.94	1.21	.92
Attachment Avoidance (ECR-R)	1–7	3.67	1.18	.93

3.3 Correlation Matrix

The correlation matrix presented in Table 3 reveals significant and theoretically meaningful associations among the main study variables. AI-assisted relationship communication (AIRCS) was strongly and positively correlated with boundary confusion (BCARS), $r = .58$, $p < .001$, indicating that higher reliance on AI in romantic communication is associated with greater uncertainty and ambiguity regarding relational boundaries. This finding supports the assumption that increased AI involvement in intimate communication may contribute to boundary-related challenges among university students.

Attachment-related variables were also significantly associated with both AI-assisted communication and boundary confusion. Attachment anxiety showed a moderate positive correlation with AI-assisted relationship communication ($r = .46$, $p < .001$) and an even stronger association with boundary confusion ($r = .52$, $p < .001$), suggesting that students with higher attachment anxiety are more likely to rely on AI tools and experience greater boundary confusion in their relationships. Similarly, attachment avoidance was positively correlated with AI-assisted relationship communication ($r = .39$, $p < .001$) and boundary confusion ($r = .47$, $p < .001$), indicating that avoidant individuals may also engage with AI in ways that are associated with blurred relational boundaries.

Finally, attachment anxiety and attachment avoidance were moderately correlated with each other ($r = .41$, $p < .001$), consistent with existing attachment research and supporting the validity of the measures used. Overall, the pattern of correlations aligns with theoretical expectations and provides preliminary support for the proposed model,

justifying further multivariate analyses to examine the predictive and explanatory relationships among AI-assisted communication, attachment styles, and boundary confusion.

Table 3: Correlation matrix of study variables (N = 420)

Variable	1	2	3	4
1. AI-Assisted Relationship Communication (AIRCS)	—			
2. Boundary Confusion (BCARS)	.58***	—		
3. Attachment Anxiety (ECR-R)	.46***	.52***	—	
4. Attachment Avoidance (ECR-R)	.39***	.47***	.41***	—

** $p < .001$.

3.5 The structural Equation Modeling Results

The structural equation modeling results presented in table 4 and in figure 2 revealed significant direct, indirect, and total effects among the study variables. AI-assisted relationship communication exerted a strong direct effect on boundary confusion ($\beta = .42$, $p < .001$). Attachment anxiety and attachment avoidance both demonstrated significant direct effects on boundary confusion, as well as significant indirect effects through AI-assisted relationship communication. Specifically, AI-assisted communication partially mediated

the relationships between attachment anxiety and boundary confusion (indirect $\beta = .16$, 95% CI [.11, .22]) and between attachment avoidance and boundary confusion (indirect $\beta = .12$, 95% CI [.08, .18]). Total effects indicated that attachment anxiety ($\beta = .47$) and attachment avoidance ($\beta = .39$) exerted substantial overall influence on boundary confusion. All confidence intervals excluded zero, supporting the robustness of the mediation effects. The structural equation model was estimated while controlling for as covariates.

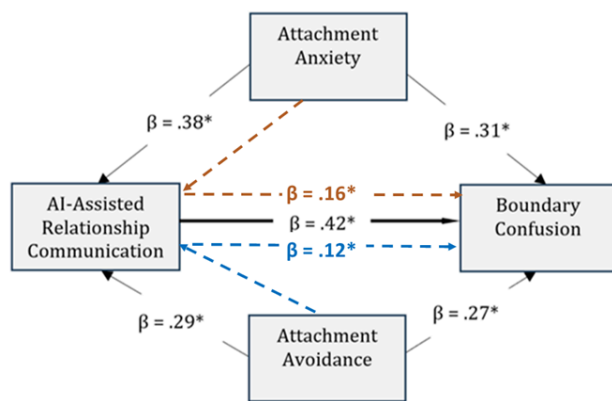
Table 4. Direct, Indirect, and Total Effects Predicting Boundary Confusion (N = 420)

Predictor	Outcome	Effect Type	Standardized Effect (β)	95% Bootstrapped CI
Attachment Anxiety	Boundary Confusion	Direct	.31***	[.24, .38]
Attachment Anxiety	Boundary Confusion	Indirect (AI-Assisted Relationship Communication)	.16***	[.11, .22]
Attachment Anxiety	Boundary Confusion	Total	.47***	[.39, .55]
Attachment Avoidance	Boundary Confusion	Direct	.27***	[.20, .34]
Attachment Avoidance	Boundary Confusion	Indirect (via AI-Assisted Relationship Communication)	.12***	[.08, .18]
Attachment Avoidance	Boundary Confusion	Total	.39***	[.31, .47]
AI-Assisted Relationship Communication	Boundary Confusion	Direct	.42***	[.35, .49]

Note. Indirect effects were estimated using bias-corrected bootstrapping with 5,000 resamples.

** $p < .001$

Figure 2. Structural equation model predicting boundary confusion



Model Fit: $\chi^2/df = 2.21$; CFI = .95; TLI = .94; RMSEA = .054; SRMR = .041

$p < .001$

4. Discussion

The present study provides robust quantitative evidence that AI-assisted relationship communication is significantly associated with boundary confusion among university students. It also demonstrates that attachment insecurity plays a central role in shaping these dynamics. The structural equation model demonstrated that AI-assisted communication directly predicted boundary confusion ($\beta = .42, p < .001$), supporting the notion that increased reliance on AI in romantic interactions is linked to greater uncertainty regarding emotional roles, intimacy limits, and relational expectations. These findings extend prior research on technology-mediated communication by highlighting AI not merely as a neutral tool, but as an active relational mediator capable of influencing psychological boundaries (Wu et al., 2022).

Attachment anxiety emerged as a particularly strong predictor of both AI-assisted relationship communication ($\beta = .38, p < .001$) and boundary confusion ($\beta = .31, p < .001$). This pattern aligns with attachment theory, which posits that anxiously attached individuals are more likely to seek reassurance and emotional validation when faced with relational uncertainty (Tan et al., 2023). In the context of AI, such individuals may perceive AI systems as readily available, responsive, and non-rejecting sources of emotional support. Recent empirical work has shown that attachment anxiety predicts emotional attachment to AI companions and greater trust in conversational AI systems (Yang & Oshio, 2025). The present findings build on this literature by demonstrating that such reliance may come at a psychological cost, manifesting as boundary confusion within romantic relationships.

Similarly, attachment avoidance was significantly associated with AI-assisted communication ($\beta = .29, p < .001$) and boundary confusion ($\beta = .27, p < .001$). Avoidantly attached individuals typically value emotional distance and autonomy and may experience discomfort with vulnerability in close relationships. AI tools may therefore serve as a convenient alternative for managing emotional needs without engaging in direct interpersonal closeness. This interpretation is consistent with prior research indicating that avoidant individuals are more likely to use digital or mediated channels to regulate intimacy and reduce relational demands (Suriá-Martínez et al., 2025). In this study, such patterns appear to contribute to communicative substitution and relational role ambiguity, core components of boundary confusion.

Importantly, attachment anxiety and avoidance also showed indirect effects on boundary confusion through AI-assisted communication, indicating that AI use partially mediates the relationship between attachment insecurity and boundary-related difficulties. This finding supports emerging theoretical perspectives that conceptualize AI as an attachment-regulation agent, capable of temporarily alleviating distress while simultaneously reshaping relational processes (Babu et al., 2025). Unlike traditional communication technologies, contemporary AI systems simulate empathy, personalization, and conversational reciprocity, features that may intensify users' emotional engagement and blur distinctions between instrumental support and relational intimacy.

The observed levels of boundary confusion, particularly emotional boundary blurring and ethical boundary tension, underscore the psychological complexity of AI involvement in romantic relationships. Emotional boundary blurring suggests that some students may begin to attribute relational functions, such as understanding or emotional attunement, to AI systems rather than to their partners. Ethical boundary tension, including concerns about authenticity, transparency, and privacy, reflects growing unease about the legitimacy of AI-mediated emotional exchanges. These findings resonate with recent discussions in the literature warning of “illusions of intimacy” in human–AI relationships, where users may overestimate the relational capacity of AI agents (Nkurunziza & Munganyinka, 2024).

From a developmental perspective, university students represent a population particularly vulnerable to these dynamics. Emerging adulthood is characterized by identity exploration, emotional experimentation, and the formation of intimate relationships. Within academically demanding environments, AI tools may offer immediate emotional relief and cognitive support. However, when AI becomes embedded in core relational processes, such as conflict resolution or emotional disclosure, it may interfere with the

development of interpersonal communication skills and mutual emotional responsibility. Willoughby et al. (2025) similarly observed that romantic engagement with AI technologies among young adults is associated with shifts in relational expectations and norms.

The findings carry important implications for university counseling services and student wellbeing programs. Rather than discouraging AI use outright, interventions should focus on promoting digital relationship literacy, helping students understand when AI use is supportive and when it may undermine relational clarity. Counseling practitioners may also benefit from assessing AI use patterns when working with students experiencing relational distress, particularly those with high attachment insecurity. At an institutional level, the results support calls for ethical AI design that includes transparency cues and boundary-setting features to reduce the likelihood of emotional overidentification (Kirk et al., 2025).

5. Limitations and Future Directions

This study has several limitations. First, its cross-sectional design limits causal interpretations of the relationships among attachment styles, AI-assisted communication, and boundary confusion. Longitudinal studies are needed to examine how these dynamics develop over time. Second, reliance on self-report measures may introduce social desirability and response biases. Future research could include partner reports or behavioral data. Third, the focus on university students may limit generalizability to other populations. Future studies should examine diverse age groups and cultural contexts. Additionally, further validation of the AIRCS and BCARS is recommended, along with exploration of moderating variables such as relationship satisfaction and digital literacy. Although self-report measures raise the possibility of common-method variance, additional statistical checks (Harman's single-factor test and a latent method factor in SEM) suggested that shared method bias was unlikely to account for the observed associations. Nevertheless, future research would benefit from multi-informant, behavioral, or longitudinal designs to further reduce method-related bias. Longitudinal, dyadic, and experimental designs will be necessary to disentangle these alternative pathways and to establish temporal ordering among attachment insecurity, AI-assisted relationship communication, and boundary confusion.

6. Conclusion

This study provides empirical evidence that AI-assisted relationship communication plays a significant role in shaping boundary experiences within romantic relationships

among university students. The findings demonstrate that greater reliance on AI for emotional expression, reassurance, and communication is associated with higher levels of boundary confusion, particularly among individuals with insecure attachment styles. Attachment anxiety and attachment avoidance were found to directly and indirectly predict boundary confusion, highlighting the importance of underlying relational regulation processes in understanding how young adults engage with AI in intimate contexts. By integrating attachment theory with emerging research on human-AI interaction, this study extends existing knowledge on technology-mediated relationships and identifies AI as a meaningful relational influence rather than a neutral communication tool. The results underscore the need for digital relationship literacy and ethical guidance to support healthy boundary management in AI-assisted relationships. As AI continues to evolve and integrate into everyday life, understanding its psychological and relational implications will be essential for promoting authentic intimacy and relational wellbeing in academic settings.

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