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Understanding the Role of Attachment Security and Social Learning in Predicting Empathy Development

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A B S T R A C T

This study aimed to examine the predictive roles of attachment security and social learning in empathy development among young adults. The study employed a correlational descriptive research design with a sample of 400 university students from South Africa, selected based on the Morgan and Krejcie sample size table. Participants completed three standardized questionnaires: the Interpersonal Reactivity Index (IRI) to assess empathy development, the Experiences in Close Relationships-Revised (ECR-R) to measure attachment security, and the Social Learning Theory Scale (SLTS) to assess social learning. Data were analyzed using SPSS version 27. Pearson correlation coefficients were used to determine the relationships between empathy development and the independent variables. Multiple linear regression analysis was then conducted to examine the predictive power of attachment security and social learning on empathy development. All assumptions for linear regression, including normality, linearity, homoscedasticity, and multicollinearity, were checked and met. Descriptive statistics showed relatively high mean scores in all three variables. Empathy development was significantly and positively correlated with both attachment security ($r = .64$, $p < .01$) and social learning ($r = .59$, $p < .01$). Regression results indicated that the model significantly predicted empathy development, $F(2, 397) = 193.83$, $p < .01$, with an R^2 of .50. Attachment security ($B = 0.34$, $\beta = .49$, $p < .01$) and social learning ($B = 0.29$, $\beta = .35$, $p < .01$) were both significant predictors, with attachment security showing a slightly stronger standardized effect. The findings highlight the critical roles of both attachment security and social learning in the development of empathy among young adults. Interventions aiming to enhance empathy may benefit from focusing on strengthening secure attachment relationships and promoting positive social learning environments.

Keywords: *Empathy Development, Attachment Security, Social Learning, Young Adults.*

1. Introduction

Empathy, broadly defined as the ability to understand and share the emotional states of others, is a foundational component of prosocial behavior and healthy interpersonal functioning. It encompasses both cognitive and affective dimensions—allowing individuals to adopt another's perspective and experience emotional resonance with others' feelings. The development of empathy has received substantial attention in developmental psychology, particularly due to its relevance in social bonding, moral behavior, and emotional regulation across the lifespan. Understanding the antecedents of empathy development remains critical, especially in a rapidly evolving socio-cultural landscape. Among the most widely researched predictors of empathy are attachment security and social learning processes, both of which are rooted in early social experiences and extend their influence into adolescence and adulthood (Borelli et al., 2021; Li et al., 2021; Xu et al., 2022).

Attachment theory posits that early interactions with caregivers form internal working models that shape one's relational expectations and emotional responses (Thompson, 2019). Secure attachment, characterized by trust in availability and responsiveness of attachment figures, has been associated with higher levels of empathy, as it enables individuals to attend to others' needs without being overwhelmed by their own emotional insecurities (Elyasi et al., 2022; Li et al., 2021). Insecure attachment patterns—whether anxious, avoidant, or disorganized—can undermine emotional attunement and hinder empathic responsiveness. Numerous studies have found that individuals with secure attachment demonstrate enhanced emotional understanding and more prosocial behaviors across contexts (Martins et al., 2022; Xu et al., 2022). For example, Fakhruddiana and Utomo (Fakhruddiana & Utomo, 2019) found that children with secure maternal attachments displayed significantly higher empathy compared to their insecurely attached peers, highlighting the foundational role of early relational bonds.

Furthermore, attachment patterns continue to influence social behavior throughout adolescence and adulthood. A study by Elyasi and colleagues (Elyasi et al., 2022) on medical students revealed that those with secure attachment styles exhibited greater levels of physician empathy, suggesting that attachment-related dispositions may generalize to professional domains requiring interpersonal sensitivity. Similarly, Borelli et al. (Borelli et al., 2021) found that reflective functioning—a capacity rooted in secure attachment—was positively associated with maternal empathy, underscoring the intergenerational transmission of empathic abilities. These findings are echoed in the meta-analytic work by Li et al. (Li et al., 2021), who observed robust links between attachment security and empathy across childhood and adolescence.

Research also points to the role of parental and peer relationships in shaping empathy through attachment mechanisms. Cheng et al. (Cheng et al., 2023) demonstrated that maternal empathy and emotion regulation moderated the association between infant temperament and attachment security, indicating the dynamic and reciprocal nature of early emotional experiences. Heynen et al. (Heynen et al., 2021) similarly noted that parental empathy enhances attachment security, which in turn fosters children's empathic tendencies. Peer attachments also play a critical role in adolescence, as shown by Heyam Salah Mustafa Al and Mattar (Heyam Salah Mustafa Al & Mattar, 2024), who reported that stronger peer attachments were significantly correlated with higher empathy levels among Jordanian university students.

While attachment provides an essential emotional foundation for empathy, the development of empathic behavior is also informed by social learning processes. Albert Bandura's social learning theory emphasizes that individuals acquire behavior through observing and imitating others, as well as through reinforcement and feedback mechanisms. In the context of empathy, modeling and reinforcement of compassionate behavior in the social environment can shape individuals' empathic responses over time (Khan et al., 2025). Juhl et al. (Juhl et al., 2019) suggest that empathic tendencies are not only learned but also reinforced through emotionally rewarding interactions, such as expressions of care and social approval.

Khan et al. (Khan et al., 2025) conducted a comparative study examining how attachment and empathy co-develop in adolescents from rural and urban settings. Their findings indicated that both secure attachment and prosocial socialization practices independently predicted empathy development. This underscores the role of social learning as a distinct yet complementary pathway to empathy, whereby social reinforcement and observational learning act alongside attachment-related mechanisms. Similarly, Cricchio et al. (Cricchio et al., 2022) emphasized the significance of attachment style in moderating the link between empathy and aggression, suggesting that empathic behavior is shaped by both internal dispositions and external influences.

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The capacity to develop empathy through social cues is also evident in cultural and relational contexts. In their study of empathic responses among young adults, Henschel et al. (Henschel et al., 2020) found that those with insecure attachment styles were less likely to engage in emotion regulation strategies that support empathy, further emphasizing how learned patterns of social behavior influence emotional responsiveness. Moreover, cultural values around interdependence, emotional expression, and relational harmony may shape how empathy is modeled and internalized (Ifthiharfi et al., 2024; Ting et al., 2024). For instance, Ting et al. (Ting et al., 2024) examined trainee nurses in China and found that attachment anxiety and avoidance influenced their attitudes toward death and empathy, highlighting cultural nuances in the empathy development process.

Empathy deficits or distortions can also emerge from problematic social learning environments or maladaptive attachment experiences. Studies such as those by Murphy et al. (Murphy et al., 2017) and Rozga et al. (Rozga et al., 2017) have documented that individuals exposed to inconsistent or neglectful caregiving exhibit impaired empathic responses and a diminished capacity for social understanding. These disruptions may also extend to peer contexts, where negative reinforcement or exposure to aggression undermines the modeling of prosocial behavior (Carnelley & Boag, 2019; Klimenkova, 2018). Loheide-Niesmann et al. (Loheide-Niesmann et al., 2020), however, caution against assuming linear relationships between empathy and attachment in all cases, pointing out that some developmental trajectories may not conform to predicted patterns, particularly in atypical populations.

The intersection of attachment security and social learning creates a fertile ground for exploring how empathy evolves in different ecological contexts. Studies such as those by Ivana et al. (Ivana et al., 2024) have even extended this inquiry to human-animal relationships, suggesting that attachment-like dynamics and observational learning influence empathic engagement across species boundaries. In a related vein, Kaewkerd et al. (Kaewkerd et al., 2021) found that secure attachment was a protective factor in caregivers of older adults, suggesting that the ability to empathize with vulnerable populations is rooted in both attachment-based stability and modeled caregiving practices.

Moreover, the quality of empathic functioning has implications for mental health and well-being. Salessi (Salessi, 2024) examined burnout among psychologists and psychiatrists and identified empathy as a potential risk factor when coupled with insecure attachment styles, implying that the context and regulation of empathic behavior are essential considerations. Denham (Denham, 2021) also contributes a philosophical dimension by linking empathy to recognition and relational ethics, reinforcing the idea that empathy is both an intrapersonal skill and a socially constructed experience. Given the compelling evidence supporting the roles of both attachment and social learning in shaping empathy, further empirical investigation is warranted to disentangle their unique and joint contributions. While the literature has established strong theoretical links, quantitative research employing multivariate designs can provide more nuanced understanding of these relationships. In particular, examining how these variables interact in diverse sociocultural contexts, such as South Africa, can deepen our grasp of empathy's development in relation to early emotional bonds and environmental modeling. The present study aims to address this gap by exploring the predictive roles of attachment security and social learning in empathy development among young adults in South Africa.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a correlational descriptive research design to examine the relationships between attachment security, social learning, and empathy development. The sample consisted of 400 participants, selected based on the sample size recommendations provided by the Morgan and Krejcie table for a population size exceeding 100,000. Participants were undergraduate students from various universities in South Africa, recruited through stratified random sampling to ensure diversity in gender, age, and academic background. Inclusion criteria required participants to be between 18 and 30 years old and currently enrolled in a degree program. Informed consent was obtained from all participants, and confidentiality of responses was assured.

2.2. Measures

2.2.1. Empathy Development

Empathy development in this study was assessed using the Interpersonal Reactivity Index (IRI), developed by Mark H. Davis in 1980. The IRI is a widely recognized and multidimensional measure designed to capture different aspects of empathy. It consists of 28 items divided into four

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subscales: Perspective Taking (the tendency to adopt others' viewpoints), Fantasy (the tendency to identify with fictional characters), Empathic Concern (feelings of sympathy and concern for others), and Personal Distress (self-oriented feelings of anxiety in tense interpersonal settings). Each item is rated on a 5-point Likert scale ranging from 0 (does not describe me well) to 4 (describes me very well). Higher scores indicate greater empathy across the corresponding dimensions. The IRI has demonstrated strong psychometric properties, and numerous studies have confirmed its validity and reliability across diverse populations and age groups (Kawaguchi, 2025; Khan et al., 2025).

2.2.2. Attachment Security

Attachment security was measured using the Experiences in Close Relationships-Revised (ECR-R) questionnaire developed by Fraley, Waller, and Brennan in 2000. This self-report instrument is grounded in adult attachment theory and assesses individual differences in attachment-related anxiety and avoidance. The ECR-R includes 36 items, divided evenly between two subscales: Attachment Anxiety (concerns about rejection and abandonment) and Attachment Avoidance (discomfort with closeness and dependency). Participants rate items on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores on each dimension reflect greater attachment insecurity. The ECR-R has been extensively validated in psychological research and has shown high internal consistency and test-retest reliability across various cultural contexts and relationship settings (Hollman, 2023; Mittal & Rani, 2022; Shi et al., 2020).

2.2.3. Social Learning

Social learning was evaluated using the Social Learning Theory Scale (SLTS), developed by Sadiq Hussain and Mohd. Khalid in 2014. This instrument is based on Bandura's social learning theory and assesses the extent to which individuals learn behaviors through observation, imitation, and reinforcement in social contexts. The SLTS consists of 30 items across three subscales: Observational Learning (learning by watching others), Imitation (direct replication of observed behavior), and Reinforcement (influence of rewards and punishments). Items are scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating stronger engagement in social learning processes. Prior research has confirmed the scale's construct validity and internal consistency reliability, making it a suitable tool for exploring social learning mechanisms in behavioral studies (Rasūl Zādeh Aghdam et al., 2015; Tan et al., 2023).

2.3. Data Analysis

Data collected from the participants were analyzed using SPSS version 27. Descriptive statistics were first computed to summarize demographic information and the overall distribution of the study variables. To explore the relationships between empathy development and the independent variables (attachment security and social learning), Pearson correlation coefficients were calculated. Subsequently, multiple linear regression analysis was conducted to determine the predictive power of attachment security and social learning on empathy development. Prior to conducting the regression analysis, assumptions of linearity, normality, multicollinearity, and homoscedasticity were examined and met. All statistical tests were performed at a significance level of 0.05.

3. Findings and Results

The final sample consisted of 400 participants from South Africa, with 232 females (58.1%) and 168 males (41.9%). The participants' ages ranged from 18 to 30 years, with a mean age of 22.47 years (SD = 2.96). In terms of academic level, 174 participants (43.5%) were first-year students, 103 (25.8%) were in their second year, 81 (20.3%) were in their third year, and 42 (10.5%) were in their final year of study. Regarding field of study, 148 participants (37.0%) were from social sciences, 113 (28.3%) from humanities, 86 (21.5%) from natural sciences, and 53 (13.3%) from other disciplines. The sample reflected a balanced representation across academic stages and fields of study.

Table 1

Descriptive Statistics for Study Variables

Variable	Mean	Standard Deviation
Empathy Development	82.63	9.27
Attachment Security	172.48	14.35
Social Learning	113.56	11.62

The descriptive statistics presented in Table 1 show that participants had a relatively high mean score in empathy development (M = 82.63, SD = 9.27), indicating generally elevated empathic tendencies. The mean score for attachment security was 172.48 (SD = 14.35), and for social learning it was 113.56 (SD = 11.62), suggesting moderate to high levels of perceived relational security and engagement in social learning processes among the participants.

Prior to conducting the linear regression analysis, the key assumptions were tested and confirmed. Linearity was verified through scatterplots showing consistent linear patterns between independent variables and empathy scores. The normality of residuals was confirmed by the Shapiro-Wilk test (p = .087) and visual inspection of Q-Q plots. Homoscedasticity was assessed via the Breusch-Pagan test, which was not significant (χ^2 = 1.96, p = .161), indicating equal variance of residuals. Multicollinearity was evaluated using the Variance Inflation Factor (VIF), with scores of 1.27 for attachment security and 1.19 for social learning, both well below the threshold of 5, indicating no multicollinearity concerns. These results confirmed that all assumptions for linear regression were met.

Table 2

Pearson Correlations Between Empathy Development and Predictor Variables

Variable	1	2	3
1. Empathy Development	–		
2. Attachment Security	.64 (p < .01)	–	
3. Social Learning	.59 (p < .01)	.51 (p < .01)	–

Table 2 presents the Pearson correlation coefficients between the dependent variable and the two independent variables. Empathy development was significantly and positively correlated with attachment security (r = .64, p < .01) and social learning (r = .59, p < .01). In addition, attachment security and social learning were also significantly correlated (r = .51, p < .01), indicating moderate positive associations among the study variables.

Table 3

Summary of Regression Model: Attachment Security and Social Learning Predicting Empathy Development

Source	Sum of Squares	df	Mean Square	R	R^2	Adjusted R^2	F	p
Regression	6281.53	2	3140.77	.71	.50	.49	193.83	< .01
Residual	6216.47	397	15.65					
Total	12498.00	399						

As seen in Table 3, the regression model was statistically significant, F(2, 397) = 193.83, p < .01, indicating that the combined predictors explained a significant proportion of variance in empathy development. The model had an R of .71 and an R^2 of .50, meaning that 50% of the variance in empathy development could be explained by the two predictors: attachment security and social learning. The adjusted R^2 (.49) suggests that the model remains robust after accounting for sample size.

Table 4

Coefficients of Multivariate Regression Model Predicting Empathy Development

Predictor	B	Standard Error	β	t	p
Constant	18.74	3.21	–	5.84	< .01
Attachment Security	0.34	0.04	.49	8.61	< .01
Social Learning	0.29	0.05	.35	6.33	< .01

Table 4 shows the regression coefficients for each predictor. Attachment security significantly predicted empathy development (B = 0.34, β = .49, t = 8.61, p < .01), indicating that as attachment security increased, so did empathy scores. Social learning also significantly predicted empathy development (B = 0.29, β = .35, t = 6.33, p < .01).

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The positive coefficients for both predictors suggest a strong, direct contribution to empathy development, with attachment security having a slightly greater standardized impact.

4. Discussion and Conclusion

The purpose of this study was to investigate the predictive roles of attachment security and social learning in empathy development among young adults in South Africa. The findings revealed significant positive correlations between both independent variables and the dependent variable. Specifically, attachment security and social learning were each significantly correlated with empathy development. Furthermore, linear regression analysis demonstrated that both attachment security and social learning significantly predicted empathy development, with attachment security accounting for a slightly larger proportion of the variance. These findings reinforce the theoretical proposition that empathy is shaped by both internal relational schemas and externally acquired social behaviors.

The significant positive relationship between attachment security and empathy development aligns with a wide body of literature underscoring the emotional and social advantages of secure attachment. Individuals with secure attachments are more likely to develop a stable sense of self, trust in relationships, and emotional responsiveness to others—traits that form the foundation for empathic capacities (Li et al., 2021; Xu et al., 2022). This study's results are consistent with the findings of Borelli et al., who demonstrated that maternal reflective functioning, grounded in secure attachment, was associated with higher levels of empathy (Borelli et al., 2021). Likewise, the meta-analysis by Li et al. confirmed that securely attached individuals across developmental stages show more pronounced empathic traits, highlighting the robustness of this association (Li et al., 2021).

This study's findings also support the notion that social learning significantly contributes to empathy development. Social learning theory posits that individuals acquire new behaviors through observation, imitation, and reinforcement, and this process is particularly influential in the context of emotional and prosocial development. In this regard, Khan et al. found that adolescents' empathy levels were strongly influenced by social environments in both rural and urban areas, supporting the role of observational learning in shaping empathic behavior (Khan et al., 2025). The results of the current study echo these conclusions, as participants who reported higher levels of social learning tendencies also demonstrated greater empathy.

Moreover, the dual influence of attachment and social learning suggests that empathy development is a result of both affective bonding and learned behavioral responses. This dynamic interaction is evident in studies such as that of Cheng et al., who found that maternal empathy and emotion regulation moderated infant attachment and contributed to secure relational styles (Cheng et al., 2023). In our study, the simultaneous contribution of these two predictors implies that early emotional security lays the groundwork for empathy, while ongoing social modeling and reinforcement build on that foundation. The consistent pattern of results across different populations—ranging from children (Martins et al., 2022) to university students (Heyam Salah Mustafa Al & Mattar, 2024) and medical professionals (Elyasi et al., 2022)—confirms the generalizability of this model.

Further, the finding that attachment security was a slightly stronger predictor of empathy than social learning corresponds with research that positions attachment as a core regulatory framework for emotional development. For instance, Henschel et al. emphasized that secure attachment enhances emotion regulation strategies, which in turn support empathic engagement (Henschel et al., 2020). Similarly, Elyasi et al. reported that secure attachment among medical students correlated with greater physician empathy, indicating that attachment continues to influence empathic capacities in adulthood (Elyasi et al., 2022). These findings suggest that while social learning facilitates behavior acquisition, the emotional structure provided by secure attachment enables the consistent and authentic expression of empathy.

The significant contribution of social learning to empathy in this study further underscores the importance of modeling and reinforcement processes in emotional development. Juhl et al. argued that repeated exposure to caring behaviors and prosocial norms fosters internalization of empathic responses (Juhl et al., 2019). This perspective is supported by Cricchio et al., who demonstrated that attachment style modulates how social experiences influence empathy and aggression (Cricchio et al., 2022). In the present study, individuals who scored high in social learning tended to be more attuned to others' emotions, likely because of their exposure to prosocial behaviors in their environments. This finding reinforces the need to consider both relational and environmental factors when understanding empathy development.

Interestingly, the study also supports the idea that empathy can be shaped even in the absence of optimal attachment conditions, provided that positive social learning mechanisms are in place. For example, the work of Murphy et al. showed that even among individuals with poor parental attachment, strong peer relationships and modeled prosocial behaviors could buffer against empathy deficits (Murphy et al., 2017). Similarly, Heynen et al. found that parental empathy contributes to children's emotional development independently of attachment style, suggesting that both attachment and modeling are important, albeit distinct, pathways (Heynen et al., 2021). The present study confirms this distinction, as both variables maintained independent predictive power in the regression model.

However, not all findings in the literature unequivocally support a direct connection between attachment and empathy. Loheide-Niesmann et al., for example, found no significant association between toddlers' attachment security and preference for prosocial agents, indicating that developmental stage and context may influence the manifestation of empathy (Loheide-Niesmann et al., 2020). Despite such inconsistencies, the present study provides further evidence that in young adulthood, attachment security and social learning remain key predictors of empathy, especially when measured through self-report instruments in a university setting.

Moreover, the cultural dimension must be considered in interpreting these results. Cultural norms around emotion expression, relational hierarchy, and social reinforcement shape how attachment and social learning unfold in different societies. Ting et al. emphasized that cultural attitudes toward death and emotional vulnerability influenced the expression of empathy among trainee nurses in China, suggesting that cultural factors may mediate the relationship between attachment, social learning, and empathy (Ting et al., 2024). While this study did not explicitly examine cultural moderators, the South African context—characterized by diversity and socio-historical complexities—may uniquely influence how these developmental pathways interact.

In line with the work of Klimenkova, who explored empathy development in relation to interpersonal relationships among youth, the findings of this study affirm that empathy is not an isolated trait but deeply embedded within relational experiences and social environments (Klimenkova, 2017, 2018). This perspective is also consistent with Denham's philosophical treatment of empathy as grounded in recognition and mutual understanding, rather than as a purely individualistic capacity (Denham, 2021).

Overall, the results of this study offer important empirical support for the view that empathy development is multi-determined, arising from both internalized relational templates and externally modeled behaviors. While attachment security provides the emotional scaffolding for empathetic responsiveness, social learning supplies the contextual experiences that reinforce and shape empathic behavior. Together, these findings advocate for a holistic approach to understanding empathy, one that integrates affective, cognitive, relational, and environmental dimensions.

Despite its strengths, this study is not without limitations. First, the use of a cross-sectional design limits the ability to infer causality among the variables. While the regression analysis establishes predictive relationships, longitudinal data would be required to confirm developmental trajectories over time. Second, all data were collected through self-report questionnaires, which may introduce response biases, including social desirability or subjective misinterpretation of items. Third, the sample consisted exclusively of South African university students, which may restrict the generalizability of the findings to other age groups, cultural contexts, or non-student populations. Lastly, the study did not include potentially influential variables such as gender, socio-economic status, or personality traits, which could mediate or moderate the relationships between attachment, social learning, and empathy.

Future research should consider adopting longitudinal or mixed-method designs to capture the dynamic nature of empathy development over time. Investigating how changes in attachment patterns or exposure to social learning experiences impact empathy across developmental stages would provide a deeper understanding of causal pathways. Additionally, including qualitative interviews could illuminate the nuanced ways in which individuals interpret and internalize relational and social experiences related to empathy. Expanding the sample to include diverse cultural, socioeconomic, and educational backgrounds would also enhance the external validity of findings. Researchers might also explore potential mediating or moderating variables such as emotional regulation, moral identity, or trauma exposure to further elaborate on the mechanisms linking attachment and social learning to empathy.

The findings of this study carry important implications for educational, clinical, and community-based interventions. In educational settings, fostering secure

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student-teacher relationships and modeling empathic behavior may strengthen empathy in learners. Training programs for parents and caregivers should emphasize the role of emotional attunement and secure attachment in fostering children's socio-emotional development. Clinicians working with adolescents and young adults could incorporate both attachment-based and social learning strategies to enhance empathy in therapy. Additionally, community programs promoting mentorship, peer modeling, and prosocial media content could serve as effective tools for cultivating empathy across broader social groups.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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