| RESEARCH ARTICLE

Relationship between Father–Daughter Relationships and Women's Dependence on Virtual Male Characters: The Mediating Effect of Attachment Styles

Hoiying Lin[1],Tong Li[1] and Yuhan Wu[2]

[1]*Fujian Normal University, Department of Psychology, Fuzhou*

[1]*Soochow University, Department of Psychology, Suzhou, 215000*

[2]*Nanjing Forestry University, College of Humanities and Social Sciences, Nanjing, 210000*

Corresponding Author: Hoiying Lin, **E-mail**: linhoiying19@gmail.com

| **ABSTRACT**

China's gaming market has attracted a significant number of female players, increasing the popularity of romance games that feature interactions with virtual male characters, particularly female players. This research examines how father–daughter relationships influence Chinese female players' dependence on these virtual characters and explores the mediating role of attachment styles. The study involved 235 female Otome game players and utilized the ECR-C, FPQ-R-B and IVIS questionnaires. The results reveal a weak positive correlation between the quality of father–daughter relationships and reliance on virtual male characters. Avoidant attachment has a suppressive effect on father–daughter relationships and virtual male character dependency. Overall, this study enriches the application of attachment theory in virtual contexts, illustrates how parental relationships shape female players' gaming experiences and emotional dependencies, and lays the groundwork for further exploration of psychological mechanisms in virtual interactions.

1、Introduction

Research Background

The mobile gaming market in China is growing rapidly and has high potential. In 2022, the combined revenue from PC, mobile, and console games in China was approximately $45.5 billion. Experts believe that this figure will exceed $57 billion by 2027. This growth highlights China's status as the largest gaming market in the world, making up approximately 31.7% of the total revenue from mobile games globally (Niko Partners, Inc., 2023). One of the most interesting trends is the increasing number of female gamers. In 2020, there were approximately 356 million female gamers in China, accounting for 53% of all players (Sun & Liu, 2020). This rise in female players represents a significant change in the gaming industry. Recently, the gaming market has focused on designing games for female players. For example, games, known as Otome games, are designed specifically for female players.

Otome games are very popular with female players. The female players who play the game tend to form strong emotional bonds with the male characters in the story. These games allow parasocial interactions, where players create one-sided relationships with idealized characters, who are often depicted as handsome, charming, and devoted (Gong & Huang, 2023). This kind of relationship offers emotional closeness without the fear of rejection since these characters exist only in the game (Chi, 2019; Erickson et al., 2018). Players can connect with the characters' experiences, join them on adventures, and unlock extra content, which deepens their emotional involvement (Ganzon, 2018). By providing an escape into romantic fantasies, Otome

games can help reduce feelings of loneliness, increase self-esteem, and create a sense of belonging among players who share similar interests (Stein et al., 2022). All these aspects make Otome games a captivating genre that meets the emotional needs of women today, and this genre has become the most popular category of mobile games for women in China (Huan, 2022). On the other hand, romantic parasocial interaction positively affects in-game purchase intention (Gong & Huang, 2023), indicating that players might increasingly invest emotionally and financially in these virtual relationships at the expense of real-life engagement. Moreover, the perfection of male characters in the Otome game might set unrealistic expectations for real-life relationships, which could lead to dissatisfaction or withdrawal from actual romantic opportunities (Liu & Lai, 2020).

Research Gap and Objectives

In recent years, many studies have focused on Otome games, primarily examining their game characteristics and development (Andlauer, 2018; Zhang, 2024), analysing or critiquing character design (Dunkel-Duerr, 2021; Huan, 2022), exploring female players' emotional engagement (Ganzon, 2018; Sinagra, 2021), and investigating how the functional design of Otome games attracts female players (Feng, 2024). However, there has been limited research on how personal and family factors influence female players' engagement with virtual characters. The father–daughter relationship, in particular, is a developmental factor that affects a girl's emotional and social maturation. A close bond with a father can influence a woman's preferences as partners and her views on marriage (Hall, 2009; Moore, 2016).

This raises the following question: could the father–daughter relationship also impact female players' attachment to male characters in Otome games? This study will examine attachment styles as a mediating factor, supporting the notion that early relationships with caregivers shape future interpersonal connections. By doing so, we aim to understand the relationship between the father–daughter relationship and the style of attachment to virtual male characters in games.

Literature Review

1.3.1、 Parent–child relationships and attachment bonds

Attachment theory provides a comprehensive framework for understanding how early caregiving experiences shape enduring relational patterns. Rooted in Bowlby's (1969) foundational work and Ainsworth et al.'s (1978) empirical validation, the theory elucidates how children develop "internal working models" that organize expectations about self-worth and others' reliability (Bowlby, 1988). These models emerge through dyadic interactions where sensitive, responsive parenting fosters secure attachment, whereas inconsistent or neglectful caregiving predisposes children to insecure attachment (Bartholomew, 1990). Contemporary research has significantly expanded our understanding of paternal influences, demonstrating that fathers serve as distinct yet equally crucial attachment figures who particularly influence daughters' relational development (Lamb & Lewis, 2010; Newland & Coyl, 2010). Through the dual primary attachment model, we understand that mothers typically provide emotional comfort (safe haven), whereas fathers facilitate exploration and identity formation, together creating a balanced developmental environment (Grossmann et al., 2002). The quality of father–daughter relationships involves specific pathways to insecure attachment: when fathers are emotionally unavailable or inconsistently responsive, daughters often develop anxious attachment characterized by hyperactivation of the attachment system, manifesting as chronic relationship anxiety, excessive need for validation, and fear of abandonment (Bartholomew & Shaver, 1998; Koehn & Kerns, 2017). Conversely, emotionally rejecting or neglectful fathers tend to foster avoidant attachment in daughters (Lucassen et al., 2011; Verhage et al., 2016).

H1: Father–daughter relationships negatively correlate with anxious attachment.

H2: Father–daughter relationships negatively correlate with avoidant attachment.

Parasocial bond to virtual male characters

Female players form intimate connections with virtual male characters in Otome games through a progressive process of parasocial interaction (PSI) and romantic parasocial interaction (RPSI). PSI initially emerged as players engage in one-sided, nonreciprocal exchanges with characters during gameplay, perceiving a sense of intimacy despite the fictional nature of these relationships (Horton & Wohl, 1956; de Bérail et al., 2019). Through repeated interactions, such as dialogue choices, virtual dating, and narrative decisions, players develop parasocial relationships (PSRs), wherein characters become enduring sources of emotional connection (Gong & Huang, 2023; Klimmt et al., 2006). Over time, these bonds may evolve into RPSI, characterized by romantic feelings akin to real-world relationships, as players invest emotionally in idealized male characters who embody traits such as charm, devotion, and reliability (Liu & Lai, 2020). The interactive design of Otome games amplifies this process by simulating reciprocal affection (e.g., character responses to player choices) and offering risk-free intimacy, which satisfies players' needs for security and validation (Erickson et al., 2018; Stein et al., 2022). For anxiously attached individuals, these virtual relationships may compensate for real-life relational insecurities, as they provide stable, low-rejection connections (Rain & Mar, 2021), whereas avoidantly attached players may resist such bonds due to discomfort with intimacy. They may occasionally

immerse themselves in narratives in response to high anxiety (Chandran, 2023). Ultimately, PSI and RPSI enable female players to project unmet romantic desires onto virtual characters, fostering dependency that mirrors real attachment dynamics (Stever, 2017; Bien-Munsayac, 2023).

Securely attached individuals, while not the focus of PSR studies, typically engage at a moderate level (Cole & Leets, 1999). They are better equipped to trust others and engage in relationships, whether real or fictional. They may turn to fictional characters for comfort during challenging times but do not rely solely on these characters to meet their relational needs. This balanced attachment allows them to appreciate characters for emotional support without becoming overly dependent, which may occur with insecurely attached individuals. Focusing on two types of insecure attachment, this paper explores the relationship between insecure attachment and virtual male role dependency. On the basis of these findings, this paper hypothesizes that attachment styles significantly influence the nature and strength of PSIs, with anxious individuals showing stronger engagements than their avoidant counterparts do.

H3: Anxious attachment has a direct positive effect on virtual male role dependency for female players.

H4: Avoidant attachment has a direct positive effect on virtual male role dependence, but the effect is weaker than that of anxious attachment.

1.3.3 Father–daughter relationships and virtual male character dependency

The quality of father–daughter relationships may influence women's attachment styles, which in turn affects their mate preferences and satisfaction in intimate relationships. Scheffler and Naus (1999) reported that the quality of a woman's relationship with her father is significantly correlated with her satisfaction in intimate relationships in adulthood. Attachment theory provides a powerful framework for understanding this influence. Bowlby's (1969) attachment theory posits that early attachment relationships form internal working models that influence an individual's future interpersonal relationships. In recent years, the rise of virtual romantic partners and AI companions has provided a new perspective for studying attachment relationships. Döring and Poeschl (2019) examined people's interactions with virtual companions and reported that some individuals develop strong emotional attachments to virtual characters. This phenomenon may be related to an individual's attachment style. Combining these findings, this paper hypothesizes that father–daughter relationships may influence women's dependency on virtual male characters through their attachment styles. This research direction not only helps deepen our understanding of father–daughter relationships and attachment theory but also provides insights into emerging virtual relationship phenomena in modern society.

H5: Father–daughter relationships may influence women's dependency on virtual male characters.

Figure 2
Intermediation effects modelling diagram
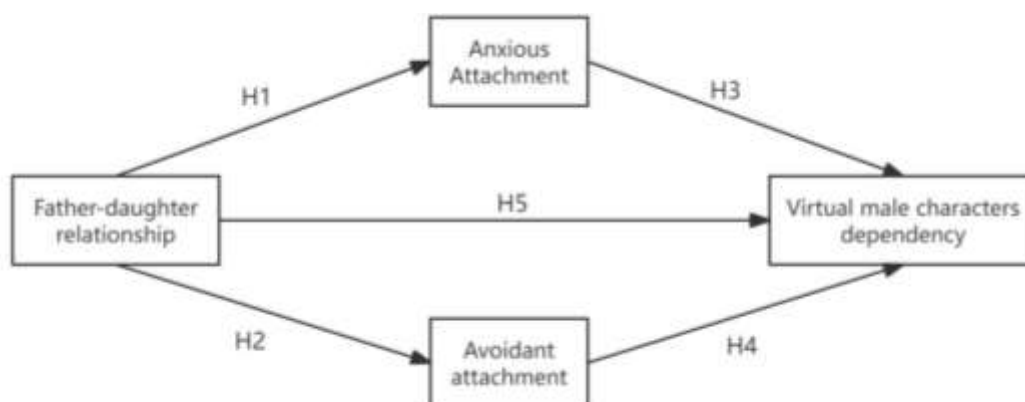
2、Method

2.1 Participants and procedure

This study employed a questionnaire survey specifically targeting Chinese female players in Otome games. The participant selection criteria focused on female adults. The participants were recruited voluntarily from online Otome game communities and from participants' QQ groups.

The questionnaire was created via the SoJump platform. The participants were instructed to complete the questionnaire in approximately 20 minutes. To verify their gamer identity, participants were randomly selected to answer "What is your favourite Otome game?", "What is your favourite virtual male character in the Otome game?" and "Why do you like this character?" Finally, all participants received a small monetary reward for their involvement.

Of the 278 questionnaires returned, 29 with incorrect polygraph responses, 4 with similar answers from the same IP, 9 with atypical response times, and 1 from a participant under 18 were excluded, yielding 235 valid responses and an 85% validity rate. The descriptive information of the participants is shown in Table 1.

Table 1
Descriptive Statistics of Participants (n = 235)

Survey Items	Subitems	Frequency	Percentage (%)
Age	18-24 years	213	90.64
	25-34 years	22	9.36
Educational Background	Below Bachelor' s	18	7.66
	Bachelor' s	206	87.66
	Graduate or above	11	4.69
Family Location	Rural	72	30.64
	Urban	163	69.36
Relationship Status	Single	170	72.34
	In a relationship	61	25.96
	Married	4	1.7
Years Playing Otome Games	Less than 1 year	32	13.62
	1-2 years	85	36.17
	2-3 years	75	31.91
	3-4 years	18	7.66
	More than 4 years	25	10.64
In-game Spending	No spending	99	42.13
	Spending	136	57.87

2.2 Measures

2.2.1 The Chinese version of the Experiences in Close Relationships (ECR-C) scale

The Experiences in Close Relationships Scale (ECR), initially developed by Brennan, Fraley and Waller to assess adults' anxious and avoidant attachment styles (Brennan et al., 1998), was later introduced to China and adapted into a Chinese version of the ECR (Li & Kato, 2006). The ECR-C comprises two factors, attachment anxiety and attachment avoidance, with each factor containing 18 items, resulting in a total of 36 questions. A sample item from the attachment anxiety factor is "I am afraid that I

will lose my partner's love," whereas a sample item from the attachment avoidance factor is "I prefer not to show a partner how I feel deep down." Participants respond on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The Cronbach's alpha coefficients for the two factors are 0.77 and 0.82, respectively, and the retest reliability values are 0.72 and 0.71, indicating good psychometric properties.

2.2.2, Brief version of the Chinese revision of the Father Presence Questionnaire (FPQ-R-B)

The Father Presence Questionnaire (FPQ) is designed to measure the perceptions and experiences of adult children regarding their fathers (Krampe & Newton, 2006). Chinese scholars have revised the FPQ into the FPQ-R-B from a substantive perspective (Ning, 2012), which contains three higher-order dimensions (relationships with fathers, family intergenerational relationships, and beliefs about fathers) and eight subscales (feelings toward fathers, mothers' support for father–child relationships, perceptions of father involvement, physical interactions with fathers, parental relationships, mothers' relationships with maternal grandfathers, fathers' relationships with grandfathers, fathers' influence on the concept), totaling 31 items on a five-point Likert scale ranging from 1 (never) to 5 (always). A sample item is "I feel that my father always has my back and supports my choices and actions." The Cronbach alpha values for the three higher-order dimensions are 0.91, 0.84, and 0.87, respectively, and the Cronbach alpha values for the eight subscales range from 0.73 to 0.89. The retest reliability of this scale ranges from 0.53--0.79, indicating good reliability and validity (Pu et al., 2012a, 2012b).

2.2.3 internet Virtual Intimacy Scale (IVIS)

The internet Virtual Lovers Intimacy Scale (IVIS) was adapted from the Social Network Addiction Tendency Scale for College Students (Wang, 2016) to measure the degree of dependence female Otome game players have on male virtual characters. To evaluate the reliability and validity of the IVIS, we recruited 76 female Otome game players online for a pretest. The final IVIS consists of 16 items divided into two dimensions: "Deep Involvement and Dependence" and "Emotional Commitment and Desire." The "Deep Involvement and Dependence" dimension reflects players' deep engagement with Otome games and the impact this has on their lives, including negative effects on sleep patterns and concentration in work or studies, which suggest a tendency toward addiction to Otome games. A sample item from this dimension is "I have fewer face-to-face interactions with others because I spend too much time on Otome games." Conversely, the "Emotional Commitment and Desire" dimension focuses on players' emotional connection to virtual characters and storylines in the games. This dependence is reflected in players' expectations and emotional needs regarding the games, as illustrated by the item "I always find myself checking messages from my virtual lover in the Otome game over and over again." The questionnaire was scored on a five-point Likert scale, with 1 (very untrue of me) and 5 (very true of me). The Cronbach's alpha for the 16 items is 0.927, with Cronbach's alphas for the two dimensions being 0.79 and 0.76. In the validity analysis, the KMO value is 0.937, and Bartlett's test of sphericity results in $p < 0.001$.

3、Results

The aim of this research is to explore the impact of the father–daughter relationship on women's dependence on virtual male characters and to further analyse this influence through two different types of insecure attachment (anxious attachment and avoidant attachment) as mediating variables. To analyse our data, this study employed SPSS 26.0 and the PROCESS macro developed by Hayes to conduct descriptive analysis, correlation analysis and mediation analysis (Hayes, 2013).

Intercorrelations of all the variables

A **Table 2**

Intercorrelations of all the variables in the study (n = 235)

	M	SD	1	2	3	4
1. Father-daughter relationship	114.936	19.168	1			
2. Avoidant attachment	3.35	0.932	-0.302**	1		
3. Anxious attachment	4.288	1.086	-0.083	0.319**	1	
4. Virtual male character dependency	55.14	12.844	0.159*	0.094	0.326**	1

Note. * $p<0.05$, ** $p<0.01$

correlation analysis was conducted on the total means of the father–daughter relationship, anxious attachment, avoidant attachment, and dependence on virtual male characters, and the results are presented in Table 2. The father–daughter relationship has a weak positive correlation with virtual male character dependency ($r = 0.159$, $p = 0.015$). Although the father–daughter relationship is negatively correlated with both types of attachment, supporting H1 and H2, only the correlation with

avoidant attachment is statistically significant (r = -0.302, p < 0.001), whereas there is no significant correlation with anxious attachment (r = -0.083, p = 0.205). Additionally, virtual male character dependency is significantly positively correlated with anxious attachment (r = 0.326, p < 0.001) and shows no significant correlation with avoidant attachment (r = 0.094, p = 0.152), indicating that virtual male role dependence is more strongly correlated with anxious attachment than with avoidant attachment.

3.2 Mediation of two insecurely attached individuals

3.2.1 Avoidant attachment as a mediator

The mediating effect of avoidant attachment on the relationship between the father–daughter relationship and dependence on virtual male characters was tested via Model 4 from the PROCESS program, with the results presented in Table 3. The results indicate that this effect manifests as a suppression effect. First, the total effect (c) of the father–daughter relationship on virtual male character dependency was significant (B = 0.107, p < 0.05). Next, the regression coefficient (a) for the effect of the father–daughter relationship on avoidant attachment was also significant (B = -0.015, p < 0.001), and the regression coefficient (b) for avoidant attachment's effect on virtual male character dependency was significant (B = 2.147, p < 0.05), supporting H4. The direct effect (c') of the father–daughter relationship on virtual male character dependency and the mediated effect (ab) subsequently had bootstrap 95% confidence intervals of [0.138–0.05] and [-0.032–-0.106], respectively, both of which do not include zero. This finding indicates that the father–daughter relationship can predict virtual male character dependency through the mediating role of avoidant attachment. Furthermore, since (c) is significant (B = 0.138, p < 0.001) and has a sign opposite to that of (ab), we can infer that avoidant attachment suppresses the father–daughter relationship and virtual male character dependency. This means that the father–daughter relationship influences virtual male character dependency through avoidant attachment. The mediating effect accounts for 22.84% of the direct effect, indicating that 22.84% of the influence of the father–daughter relationship on virtual male character dependency is achieved through this mediating effect.

3.2.2   **Table 3**

The Mediation of Avoidant Attachment (n = 235)

Variable	Effect	*SE*	*t*	*p*	95%CI
Father-daughter relationship → Virtual male character dependency (c)	0.107*	0.043	2.458	0.015	0.107~0.022
Father-daughter relationship → Avoidant attachment (a)	-0.015**	0.003	-4.834	0.000	-0.015~-0.021
Avoidant attachment → Virtual male character dependency (b)	2.147*	0.926	2.318	0.021	2.147~0.332
Father-daughter relationship → Avoidant attachment → Virtual male character dependency (a*b)	-0.032	0.026	-1.226	0.220	-0.032~-0.106
father-daughter relationship → Virtual male character dependency (c')	0.138**	0.045	3.065	0.002	0.138~0.05

Note. * p < 0.05, ** p < 0.01

Anxiety attachment as a mediator

The same method was used to analyse the mediating effect of anxious attachment between the father–daughter relationship and virtual male character dependency, and the results are presented in Table 4. The results indicated that the mediating effect was not significant. First, the total effect of the father–daughter relationship on virtual male character dependency was significant (B = 0.107, p < 0.05). The regression coefficient (a) for the effect of the father–daughter relationship on anxious attachment was not significant (B = -0.005, p > 0.05), whereas the regression coefficient (b) for anxious attachment's effect on virtual male character dependency was significant (B = 4.043, p < 0.001), supporting H3. Additionally, the bootstrap 95% confidence interval for the mediating effect (ab) of the father–daughter relationship on virtual male character dependency was [-0.08~0.02], which included 0, indicating that the mediating effect was not significant. This means that although anxious attachment has a direct effect on virtual male character dependency, the father–daughter relationship cannot predict virtual male character dependency through the mediating role of anxious attachment.

Table 4

The Mediation of Anxious Attachment (n = 235)

Variable	Effect	SE	t	p	95%Cl
Father-daughter relationship → Virtual male character dependency (c)	0.107*	0.043	2.458	0.015	0.022~0.191
Father-daughter relationship → Anxious attachment (a)	-0.005	0.004	-1.27	0.205	-0.012~0.003
Anxious attachment → Virtual male character dependency (b)	4.043**	0.722	5.599	0.000	2.628~5.458
Father-daughter relationship → Anxious attachment → Virtual male character dependency (a*b)	-0.019	0.025	-0.757	0.449	-0.08~0.02
father-daughter relationship → Virtual male character dependency (c)	0.125**	0.041	3.068	0.002	0.045~0.206

*Note. * p < 0.05, ** p < 0.01*

4、Discussion

Overview of Findings

Our study revealed the correlations and direct effects between father–daughter relationships and dependency on virtual male characters in Otome games. Specifically, avoidant attachment had a suppressive effect on the relationship between the father–daughter relationship and virtual character dependency; however, anxious attachment did not have a mediating effect.

4.2 Attachment Styles and Virtual Character Dependency

Both anxious and avoidant attachment styles directly influence dependency on virtual male characters. In particular, female players with anxious attachment are more strongly dependent on virtual characters than are those with avoidant attachment. This finding is consistent with previous research (Chandran, 2023; Cole & Leets, 1999). It is generally recognized that parasocial interactions fulfil players' romantic fantasies and address their unmet social and emotional needs (Greenwood & Long, 2010). Players can feel "loved" through interactions with virtual characters, fostering a sense of intimacy (Isbister, 2016). Players with anxious attachment often seek reassurance and intimacy through these interactions, cultivating more vivid imaginations and deeper emotional connections with virtual figures. Interacting more frequently with virtual characters may lead to greater dependency on them. In contrast, women with avoidant attachment may experience less imaginative engagement and weaker emotional ties to the virtual realm, resulting in reduced interaction and lower attachment to these characters (Lou & Kim, 2019).

4.3、The Role of Father–daughter Relationships

The father–daughter relationship positively influences dependency on virtual male characters, and this relationship is mediated by avoidant attachment. Our findings indicate that the father–daughter relationship has a positive effect on dependency on virtual male characters in Otome games, suggesting that a stronger paternal bond encourages female players to develop parasocial relationships with virtual characters. A good father–daughter relationship promotes secure attachments, and securely attached players can autonomously regulate their emotional needs for virtual characters, turning to them for dependence only when they are in a state of need (Cole & Leets, 1999). Furthermore, avoidant attachment suppresses dependency on virtual male characters, suggesting that a poorer paternal bond may lead to the formation of avoidant attachment, thereby reducing the likelihood of reliance on virtual male characters.

4.4 Limitations and Future Directions

On the other hand, this study suggests that there is a lack of a significant relationship between the father–daughter relationship and the development of anxious attachment styles in daughters; therefore, the mediating effect of anxious attachment cannot be found between the father–daughter relationship and dependency on virtual male characters. Several factors may contribute to this result. For example, anxious attachment patterns are often more influenced by maternal relationships. The development of anxious attachment seems to be linked to maternal caregiving practices, with fathers typically playing a less active role in early childhood (Ahnert & Schoppe-Sullivan, 2020). Daughters may perceive their fathers as more disapproving than their mothers do and tend to seek advice on personal issues, primarily from their mothers (Freeman & Almond, 2010). Close peer relationships also influence attachment styles, especially for emerging adults, as these relationships often provide a greater sense of reciprocity than parent–child dynamics do (Hazan & Zeifman, 1994). Given these factors, our analysis concludes that the father–daughter relationship does not directly predict dependency on virtual characters through anxious attachment. This indicates the complexity of attachment styles and their origins, suggesting that further research is

necessary to examine other influences that contribute to the development of anxious attachment and its implications for virtual interactions.

While this study makes valuable contributions to the field, it is important to acknowledge certain limitations. First, our findings indicated no significant correlation between anxious attachment and father–daughter relationships. This absence may stem from measurement limitations or sample characteristics rather than reflecting a true lack of relationship. Second, the study did not investigate secure attachment patterns as potential mediators, limiting our understanding of how positive father–daughter relationships may mitigate excessive dependency on virtual characters. Future research should examine how secure attachment affects engagement in virtual relationships. Third, cultural factors and social contexts were not exhaustively considered in our analysis. The influence of father–daughter relationships and attachment patterns may vary across different cultural contexts, especially with respect to social norms surrounding gaming and virtual relationships. Understanding these variations is essential for a comprehensive view of attachment in the digital age. Finally, as simulated partners, such as virtual girlfriends or boyfriends, emerge with advancing AI technology, questions arise about attachment in this evolving context. Understanding how increased realism and emotional responsiveness in virtual characters influence attachment formation warrants further investigation. By addressing these limitations and exploring new research avenues, we can enhance our understanding of human attachment in the digital world.

In conclusion, recent research has focused primarily on how Otome games attract female players and the influence of these games and characters (Lei et al., 2024; Gong & Huang, 2023; Gao et al., 2024). Our research further explores how familial relationships, particularly father–daughter dynamics, affect dependency on virtual male characters. The suppressive effect of avoidant attachment illustrates how it modifies the positive influence of the father–daughter relationship, redirecting emotional reliance from real interpersonal connections to virtual connections and highlighting the complex interplay between family relationships and digital interactions in shaping emotional dependencies. This research lays a foundation for future studies on the interplay between virtual characters and real-life interpersonal attachment.

Conclusion

In summary, this study explores the influence of father–daughter relationships on Chinese female players' attachment to virtual male characters in Otome games, employing attachment styles as mediating variables. The findings reveal a slight positive correlation between father–daughter relationships and the dependence on virtual male characters. Avoidant attachment plays a mediating role, with a suppressive effect on father–daughter relationships and virtual character dependency. In contrast, anxious attachment, despite its direct association with dependence, fails to exhibit significant mediation.

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