

The Reciprocal Effects Among Perceived Parental Conflict , Anxiety, and Internet Addiction in Higher Vocational College Students: A Developmental Cascade Model

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Abstract

Background

Internet addiction has become an elevated public health challenge specifically among higher vocational college students. The present study endeavors to elucidate the longitudinal relationships among perceived parental conflict, anxiety, and internet addiction within this population.

Methods

A three-wave longitudinal design was implemented over a one-year period, with a total sample of 4,370 higher vocational college students. The random intercept cross-lagged panel model (RI-CLPM) was applied to analyze the dynamic interrelationships among these variables.

Results

At the within-person level, perceived parental conflict, anxiety, and internet addiction each demonstrated relative stability throughout the study period. Perceived parental conflict served as a significant positive predictor of both subsequent anxiety and subsequent internet addiction. Similarly, anxiety significantly and positively predicted subsequent perceived parental conflict as well as subsequent internet addiction. Moreover, internet addiction significantly and positively predicted subsequent anxiety.

Conclusions

These results collectively indicate that anxiety constitutes a critical psychological pathway through which perceived parental conflict leads to internet addiction. Accordingly, this study offers valuable implications for the development of targeted interventions endeavoring to mitigate internet addiction behaviors among higher vocational college students.

1 Introduction

The ubiquitous adoption of the internet has brought increased attention to internet addiction as a significant issue among adolescents and young adults [1–3]. Internet addiction is characterized as an impulse control disorder marked by ineffective self-regulation of online behaviors, which produces detrimental consequences across core functional domains of life [4]. Research indicates that prolonged internet use may contribute to neurological dysfunction, hormonal imbalances, and reduced immune function, thereby fostering various psychological or physiological problems. Additionally, internet addiction frequently co-occurs with other psychological conditions, including depression, anxiety, insomnia, academic difficulties, and social withdrawal [5, 6].

Empirical research has consistently identified higher vocational college students as a high-risk group exhibiting pronounced proneness to internet addiction relative to other vulnerable populations [7–10]. Unlike their counterparts in four-year undergraduate programs, these students are at a critical developmental stage that integrates psychological maturation with vocational skill acquisition. Their relatively limited self-regulation, goal-directed planning abilities, and capacity to manage real-world pressures make them particularly prone to seeking emotional relief and a sense of achievement in virtual environments, thereby fostering addictive patterns. A recent latent profile analysis conducted in 2026 revealed that 17.7% of higher vocational college students fell into the high-risk internet addiction category, with an additional 40.2% exhibiting moderate levels of problematic internet use. The overall prevalence of internet addiction risk was notably higher than that typically observed among undergraduate students (usually ranging from 10% to 12%). This elevated susceptibility not only

enhances the generalizability of the predictive effects examined in this research but also calls for prioritized scholarly focus on this population [11, 12].

1.1 Bidirectional Relationships among Perceived Parental Conflict, Internet Addiction, and Anxiety

The family, as a crucial environment for adolescents' physical and psychological development, is closely associated with internet addiction. Family systems theory [13–15] conceptualizes the family as a fundamental emotional unit characterized by maintaining systemic homeostasis. Parental conflict constitutes a multidimensional construct encompassing emotional, behavioral, and cognitive dimensions of disputes and confrontations between marital partners, frequently attributable to divergent perspectives, conflicting aims, or ineffective communication patterns [16]. Beyond reflecting marital quality, such conflict serves as a critical indicator of overall family system health, thereby exerting far-reaching effects on other members of the family unit, especially children [17].

When children perceive systemic instability due to parental conflict, they may exhibit problematic behaviors. According to compensatory internet use theory, negative life circumstances can trigger individuals' motivation to go online as a means of alleviating negative emotions [18]. When higher vocational college students are exposed to parental conflict, they may immerse themselves in the virtual world to seek support and strength, escape from real-life fears, and consequently display increased behavioral problems such as internet addiction. Multiple empirical studies have established an association between parental conflict and internet addiction [19–23]. Individually perceived parental conflict significantly predicts internet addiction one year later [24].

Although the effect of perceived parental conflict on internet addiction among higher vocational college students is well established, the reverse causal mechanism, whether internet addiction predicts subsequent perceived parental conflict remains a critical and insufficiently investigated question.

1.2 Bidirectional Relationships between Perceived Parental Conflict and Anxiety

Empirical evidence has established a relationship between parental conflict and anxiety [25–27]. Perceived parental conflict predicts subsequent anxiety. According to the Emotional Security Theory (EST), parental conflict generates unpleasantness within the family environment, leading children to perceive instability in their parents' relationship and to remain in a prolonged state of insecurity. This, in turn, threatens children's psychological development and exacerbates various maladaptive outcomes [28]. When parents frequently quarrel or interact in an emotionally distant manner, adolescents may experience a diminished sense of security and increased uncertainty about the future, which in turn can trigger chronic tension, worry, and other anxiety-related responses [29]. A small body of research has also shown that anxious individuals significantly predict subsequent perceived parental conflict. In particular, adolescent GAD symptoms were found to significantly predict elevated conflict levels and notably greater divergences in the perception of conflict one year later [30].

1.3 Bidirectional Relationships between Anxiety and Internet Addiction

Anxiety is conceptualized as an aversive emotional state triggered by subjectively perceived uncertainty or impending threat [31]. It not only profoundly affects mental health but also exerts significant influences on emotion regulation, decision-making capacity, and health-related behaviors [32, 33]. Accumulating evidence has documented the reciprocal interplay between anxiety and internet addiction [3, 34–38], with internet addiction significantly predicting individuals' subsequent anxiety [39–42]. According to the Embodied Motivated Cognition (EMC) framework, when individuals encounter attractive or preferred stimuli, the appetitive motivational system is activated; conversely, exposure to aversive stimuli activates the defensive motivational system [43]. Thus, when individuals are separated from internet access, the defensive motivational system is activated, thereby generating anxiety-related emotional responses [44]. However, alternative perspectives suggest

that internet addiction does not necessarily cause elevated anxiety; rather, anxiety-prone individuals may be more inclined to excessively rely on the internet. This viewpoint finds support in the substitution model [45], which posits that adolescents with high anxiety are more motivated to seek a sense of control and social support through online activities, thereby increasing their vulnerability to internet addiction. From an empirical standpoint, researchers have identified anxiety as a significant predictor of internet addiction, indicating that anxious individuals may be more prone to excessive internet use as a compensatory strategy for perceived deficiencies in real-life social interactions [46–48].

In summary, perceived parental conflict, anxiety, and internet addiction may exhibit bidirectional relationships with one another. However, most previous studies have employed cross-sectional designs to examine the associations among these three variables, with relatively few adopting longitudinal designs to investigate their dynamic changes and reciprocal interactions over time. Therefore, the present study employed a longitudinal design and utilized cross-lagged network analysis to explore the temporal dynamics of perceived parental conflict, anxiety, and internet addiction, as well as the longitudinal relationships among these three variables in higher vocational college students.

1.4 Current study

Contemporary research frequently adopts the cross-lagged panel model (CLPM) to investigate developmental cascade effects; nevertheless, this analytical approach has been criticized for confounding between-person differences and within-person processes. Specifically, between-person associations capture enduring, trait-like individual disparities—for instance, whether vocational college students who report higher levels of perceived parental conflict display more severe internet addiction. In contrast, within-person effects reflect temporal fluctuations in variables relative to each individual's baseline level. These two distinct analytical frameworks address fundamentally different research questions and may even yield contradictory results, a statistical phenomenon referred to as Simpson's paradox [49]. To address this methodological limitation, the present study utilizes the random-intercept cross-lagged panel model (RI-CLPM) [50] to explore the longitudinal associations among perceived parental conflict, anxiety, and internet addiction. The RI-CLPM incorporates random intercepts to account for time-invariant, individual-specific stable traits, relaxes the assumption of linear growth trends, and estimates within-person reciprocal pathways based on the residuals of repeated measurements. By explicitly distinguishing between-person stability from within-person variability, this model provides a more rigorous analytical framework for examining temporal dynamic processes and strengthens causal inferences regarding developmental cascade effects.

Grounded in this methodological rationale, the current study pursues two core objectives: (1) to investigate whether perceived parental conflict predicts higher vocational college students internet addiction and anxiety; (2) to examine the dynamic, reciprocal longitudinal relationships among perceived parental conflict, anxiety, and internet addiction via the RI-CLPM. Accordingly, we propose the following hypotheses (see Fig. 1):

H1: Perceived parental conflict and internet addiction will demonstrate bidirectional predictive associations across time.

H2: Perceived parental conflict and anxiety will demonstrate bidirectional predictive associations across time.

H3: Anxiety and internet addiction will demonstrate bidirectional predictive associations across time.

2 Methods

2.1 Participants

This study was approved by the Committee of Academic Ethics at the authors' institution. Data were collected across three waves at a higher vocational college in Nanchang, Jiangxi Province, China: March 2025 (T1), September 2025 (T2), and March 2026 (T3). Self-report questionnaires were administered online during class hours, with each survey taking approximately 30 minutes to finish. All participants were explicitly informed that they were free to withdraw from the study at their discretion, with assurance of no negative repercussions.

A total of 5486 students completed the questionnaires at each of the three measurement time points. After excluding invalid responses due to absenteeism, regular response patterns (e.g., consistent selection of the same item across all scales), or missing key variables, 4370 participants with complete and valid data across all three waves were retained for the final longitudinal analysis. The final sample yielded an attrition rate of 20.34%. Among the 4370 valid participants, 1129 (25.84%) were male and 3241 (74.16%) were female. Ages ranged from 16 to 26 years, with a mean age of 18.99 years ($SD = 0.95$). To examine potential biases related to participant attrition, a series of attrition analyses were performed. Comparisons between the dropout group ($N = 1116$) and the retained group ($N = 4370$) revealed no significant differences in gender ($t = -0.89$, $p = 0.37$), age ($t = -0.14$, $p = 0.89$), or baseline (T1) scores for perceived parental conflict ($t = 1.27$, $p = 0.20$), anxiety ($t = 0.45$, $p = 0.65$), and internet addiction ($t = 0.58$, $p = 0.56$). These results collectively suggest that the sample attrition was random and did not introduce systematic bias into the present study.

2.2 Measures

2.2.1 Perceived parental conflict

Perceived parental conflict was measured using the Children's Perception of Interparental Conflict Scale [51], which had been culturally modified for Chinese populations [51]. This revised measurement instrument contains six self-report items, with an illustrative example reading "My parents often argue and blame each other right in front of me." All items adopt a four-point Likert scoring scheme spanning from 1 (strongly disagree) to 4 (strongly agree). Composite total scores vary between 6 and 24, whereby elevated point values correspond to adolescents' stronger subjective perceptions of parental conflict. This scale has demonstrated its reliability and applicability in earlier studies [53]. The scale showed good internal consistency across all waves: Cronbach's $\alpha = 0.87$ (T1), 0.84 (T2), and 0.78 (T3).

2.2.2 Anxiety

Anxiety was measured using the 4-item (e.g., "Feel restless and worried that something bad might happen") anxiety subscale of the Development of College Students Mental Health Screening Scale [54]. Respondents rated each item via a four-tier response scale anchored by two endpoints: 1 referring to "Did not apply to me at all" and 4 representing "Applied to me very much". Higher summed scores correspond to more serious anxious symptoms. Cronbach's alpha coefficients computed across three survey timepoints reached 0.82 at T1, 0.84 at T2, and 0.83 at T3 in the current research.

2.2.3 Internet addiction

Internet addiction was measured using the 5-item internet addiction subscale of the Development of College Students Mental Health Screening Scale [54]. Respondents scored all questionnaire items (a sample item: "Feel unable to get through the day without internet access") using a four-option Likert format, with response options ranging from 1 (Did not apply to me at all) to 4 (Applied to me very much). Cumulative point totals positively correlate with worsening levels of problematic internet addiction. Reliability analyses demonstrated outstanding internal reliability for this subscale across all three measurement cycles, with Cronbach's alpha coefficients calculated as 0.87 at T1, 0.88 at T2, and 0.86 at T3 respectively.

2.3 Data analysis

A multi-faceted analytical approach was adopted in the present investigation. SPSS 27.0 was used for all preliminary analyses, including data screening, recoding, reliability assessment, and descriptive statistics. Measurement invariance across the three longitudinal waves was subsequently examined using Mplus 8.3. After verifying strict longitudinal measurement invariance, the Random Intercept Cross-Lagged Panel Model (RI-CLPM) was constructed in Mplus 8.3 to evaluate the dynamic reciprocal associations and the potential mediating function of anxiety across time. Several critical model specifications were applied. To capture occasion-specific residual variability, residual covariances among the three observed variables were freely estimated within each time point. Equality constraints were not applied to cross-lagged or autoregressive paths across the two intervals, permitting temporal variations in predictive effects and auto-stability coefficients. Gender (1 = male, 2 = female) was incorporated as a predictor of random intercepts to adjust for the influence of such time-invariant covariates on person-specific stable traits.

The model was estimated using maximum likelihood (ML) estimation, which was selected due to its suitability for the bias-corrected bootstrap procedure used in mediation testing and given that the main study variables exhibited no serious violations of the normality assumption. Finally, the longitudinal mediating effect of anxiety in the link between perceived parental conflict and internet addiction was examined using a bias-corrected bootstrap approach with 5,000 resamples implemented in Mplus 8.3.

3 Results

3.1 Descriptive and Correlation Analyses

Correlation findings demonstrated statistically significant positive longitudinal associations of perceived parental conflict, anxiety and problematic internet addiction across all three measurement rounds, reflecting moderate-to-high temporal stability for each indicator. Meanwhile, these three constructs yielded meaningful positive synchronous and lagged correlations at concurrent and disparate assessment phases (see Table 1). Further intraclass correlation (ICC) calculations generated coefficients of 0.865 for perceived parental conflict, 0.839 for anxiety, and 0.821 for internet addiction sequentially. Such coefficient outputs suggested between-person stable disparities explained 86.5%, 83.9%, and 82.1% of total variance in respective variables, with the remaining 13.5%, 16.1%, and 17.9% of variability originating from intra-individual dynamic shifts across time.

Table 1
Descriptive and correlations among variables.

variable	M	SD	1	2	3	4	5	6	7	8	9
1. Gender											
2.T1 IC	2.197	0.666	0.106**								
3.T1 ANX	1.673	0.648	0.111**	0.397**							
4.T1 IA	2.008	0.726	0.146**	0.356**	0.640**						
5.T2 IC	2.095	0.623	0.120**	0.718**	0.359**	0.307**					
6.T2 ANX	1.543	0.587	0.139**	0.392**	0.662**	0.510**	0.469**				
7.T2 IA	1.815	0.685	0.155**	0.346**	0.519**	0.660**	0.413**	0.716**			
8.T3 IC	2.132	0.516	0.134**	0.641**	0.339**	0.286**	0.730**	0.447**	0.376**		
9.T3 ANX	1.493	0.574	0.124**	0.362**	0.582**	0.449**	0.429**	0.719**	0.572**	0.447**	
10.T3 IA	1.706	0.691	0.152**	0.323**	0.466**	0.554**	0.399**	0.584**	0.690**	0.397**	0.719**
Note: N = 4370, IC=Perceived parental conflict, ANX= Anxiety, IA=Internet addiction, T1 = Time 1, T2 = Time 2, T3 = Time 3, ** p < 0.01											

3.2 Longitudinal measurement invariance

Prior to formal longitudinal modeling, longitudinal measurement invariance was sequentially verified across the three survey phases to guarantee consistent construct interpretation of the core research constructs throughout repeated assessments. Under the analytical framework of Mplus 8.0, individual questionnaire items were set as observable indicators corresponding to the latent factors of perceived parental conflict, anxiety, and internet addiction. The testing procedure proceeded

hierarchically via three nested invariance tiers: configural, metric, and scalar constraints. Model fitness discrepancies across these increasingly restrictive constraint specifications were further contrasted. Given the well-documented susceptibility of the χ^2 statistic to large sample sizes, shifts in CFI and RMSEA (namely ΔCFI and ΔRMSEA) were adopted as the primary benchmarks to judge whether each successive invariance constraint held satisfactorily. According to Chen(2007)[55], $\Delta\text{CFI} \leq 0.01$ and $\Delta\text{RMSEA} \leq 0.015$ suggest measurement invariance across the three time points for a given construct. Hierarchical verification confirmed full scalar longitudinal invariance across perceived parental conflict, anxiety and internet addiction (see Table 2). Satisfactory scalar invariance demonstrates that all target constructs satisfy rigorous longitudinal equivalence standards, which legitimates credible cross-wave score comparisons. Supported by such favorable measurement properties, the subsequent construction of the random-intercept cross-lagged panel model (RI-CLPM) was statistically justified to explore their intertemporal associations.

Table 2
Tests of measurement invariance

Variable	Model	χ^2	df	CFI	TLI	SRMR	RMSEA	ΔCFI	ΔRMSEA
Perceived parental conflict	M1	381.445	43	0.990	0.985	0.036	0.043		
	M2	387.162	48	0.990	0.987	0.035	0.040	0.000	0.003
	M3	425.798	53	0.989	0.987	0.035	0.040	0.001	0.000
Anxiety	M1	17.272	8	0.999	0.998	0.006	0.016		
	M2	34.748	11	0.999	0.996	0.013	0.022	0.000	0.006
	M3	85.648	14	0.996	0.991	0.020	0.034	0.003	0.012
Internet addiction	M1	171.960	19	0.994	0.986	0.036	0.016		
	M2	209.334	27	0.993	0.988	0.021	0.039	0.001	0.023
	M3	123.580	31	0.996	0.995	0.017	0.026	0.003	0.013

Note: M1, configural invariance model; M2, metric invariance model; M3, scalar invariance model.

3.3 Random-Intercept Cross-Lagged Panel Model (RI-CLPM) Analysis

Model	χ^2	df	CFI	TLI	SRMR	RMSEA [95% CI]	Model Comparison	ΔRMSEA	ΔCFI
M1	16.650	9	1.000	0.999	0.006	0.014 [0.000,0.024]			
M2	148.187	12	0.995	0.980	0.028	0.051[0.044,0.059]	M2-M1	0.037	0.005
M3	57.456	15	0.998	0.995	0.015	0.026[0.019,0.033]	M3-M1	0.012	0.002
M4	198.168	18	0.993	0.983	0.033	0.048[0.042,0.054]	M4-M1	0.034	0.007

After adjusting for the confounding effect of gender, the unconstrained Random-Intercept Cross-Lagged Panel Model (RI-CLPM) yielded acceptable overall model fit (see Table 3). By contrast, model fit deteriorated significantly when cross-lagged paths were constrained to equality in Models M4 and M2. Guided by the principle of parsimony combined with optimal fit statistics, Model M3 was retained as the optimal final model ($\chi^2/\text{df} = 1.85$, CFI = 0.998, TLI = 0.995, SRMR = 0.015, RMSEA = 0.026; see Fig. 2).

At the between-person level, perceived parental conflict, anxiety, and internet addiction were all significantly interrelated. At the within-person level, autoregressive paths revealed moderate to high temporal stability for each construct across time points. Regarding cross-lagged predictive effects, fluctuations in perceived parental conflict from T1 to T2 positively predicted subsequent changes in anxiety and internet addiction at T2 and T3. Likewise, within-person changes in anxiety from T1 to T2 significantly and positively predicted later shifts in perceived parental conflict and internet addiction at T2 and

T3. Furthermore, variations in internet addiction from T1 to T2 significantly predicted subsequent changes in anxiety at T2 and T3.

4 Discussion

Built upon the random-intercept cross-lagged panel model (RI-CLPM), the present longitudinal research explored intra-individual temporal linkages linking perceived parental conflict, anxiety and internet addiction among vocational college undergraduates. On the whole, empirical findings offered partial empirical validation for the preset research hypotheses. Specifically, perceived parental conflict exerted prospective predictive effects on later internet addiction, yet the reverse predictive pathway from internet addiction to subsequent parental conflict perceptions failed to reach statistical significance, hence lending partial support to Hypothesis 1. Consistent with Hypothesis 2, bidirectional longitudinal predictions existed between perceived parental conflict and anxiety, whereby each variable positively forecasted the other's later fluctuations. In line with Hypothesis 3, notable reciprocal longitudinal associations were verified between anxiety and internet addiction.

4.1 Developmental Trends and Contextual Interpretation

The observed decline-then-rebound fluctuation of perceived parental conflict, coupled with the general downward developmental trajectories of anxiety and internet addiction, mirrors subtle developmental and environmental shifts occurring among vocational college students as they progress through successive academic grades.

The relatively high baseline scores recorded at T1 (the second semester of Grade One) can be plausibly explained by prolonged on-campus residence; greater physical separation from family members lessens daily parent–child interactions and accordingly curtails the occurrence of interparental conflicts perceived by adolescents [56]. During this stage, higher vocational college students continue to face adaptation pressures, as they cope with academic burnout, environmental maladjustment, and identity diffusion, resulting in significant anxiety. To escape real-life stressors, they turn to the online world for emotional solace and consequently engage in excessive internet use[57, 58].

The measurable drop in perceived parental conflict at the T2 assessment (the first semester of sophomore year) corresponds to a critical adaptive phase for enrolled students. Forming regular and steady daily routines on campus together with gradual improvements in personal self-efficacy jointly promotes this favorable adaptive transition. Research has shown that self-efficacy improves with deeper engagement in specialized academic studies, and this enhanced intrinsic strength reduces students' reliance on parental approval, thereby attenuating the intensity of parent–child conflict[59]. This stage represents a critical turning point in psychological adaptation. Some well-adapted students begin to develop psychological resilience, enabling them to cope effectively with anxiety, and consequently, their excessive internet use behaviors diminish[62].

A resurgence of perceived parental conflict captured at T3 (the second semester of sophomore year) marks a pivotal transitional stage wherein vocational undergraduates prepare for graduation and workforce entry. At this critical juncture, divergent viewpoints frequently emerge between parental occupational anticipations and young adults' independently determined career pathways [56], thereby contributing to a rise in perceived parental conflict. Through adjustment during the first two academic years, some students have developed relatively strong psychological resilience, which enables them to effectively buffer against stress[61]. As internships commence, higher vocational college students gain authentic occupational experiences and enhanced professional identity. This sense of “certainty” reduces diffuse anxiety [60]. Moreover, with increasing grades, higher vocational college students develop more mature coping mechanisms, thereby diminishing problematic internet use.

4.2 Within-Person Cascades: From Perceived Parental conflict to Internet Addiction

From an intra-individual perspective, elevated perceptions of parental conflict functioned as a persistent precursor to subsequent rises in anxiety and problematic internet addiction. This finding aligns with the Emotional Security Theory [28] and the Compensatory Internet Use Theory [18]. Specifically, when individuals perceive parental conflict, their emotional security is threatened. To restore this sense of security, they allocate attentional resources to monitor the environment, and this sustained state of vigilance depletes emotion regulation resources, thereby leading to elevated anxiety levels [64]. When individuals' psychological needs in real life (e.g., belongingness, autonomy, and competence) are not met, they turn to the online space for compensation. In family environments characterized by perceived parental conflict, higher vocational college students often lack emotional support and a sense of security. This state of "need deprivation" drives them to overuse the internet to obtain positive experiences that are missing in their real lives [63, 64].

4.3 The Reciprocal Relationship between Anxiety and Internet Addiction

The present findings provide compelling support for a bidirectional association between anxiety and internet addiction, thus empirically substantiating H3. Specifically, anxiety emerged as a significant predictor of subsequent internet addiction. Drawing upon Compensatory Internet Use Theory, it is proposed that individuals who encounter adverse emotional experiences in daily life may resort to online engagement as a coping strategy to obtain emotional compensation and relief. This pattern of compensatory use, in turn, heightens the risk of developing addictive behaviors [18]. Empirical research has demonstrated that higher vocational college students experience elevated levels of anxiety, indicating that this population possesses unique psychological vulnerabilities [65]. When confronted with anxiety-related distress in their real-world contexts, higher vocational college students are prone to employing the online environment as a venue for psychological escape and compensation, which may subsequently foster internet dependence [68, 69].

Conversely, internet addiction also predicted subsequent anxiety. The core motivation underlying higher vocational college students' internet addiction is the compensation for unmet psychological needs in reality. When their needs for belongingness, competence, and autonomy cannot be satisfied through academic achievement, social interaction, or skill development in the real world, the internet offers low-cost, immediate gratification feedback. However, this compensation is "pseudo" in nature, achievements in the virtual world cannot resolve real-life problems such as academic underperformance and social withdrawal. In contrast, prolonged internet addiction widens the discrepancy between the "ideal self" and the "actual self", thereby forming a vicious cycle of "escape via internet → real-life deterioration → increased anxiety → heightened internet dependence" [11, 65, 68].

Fundamentally, these two issues interact to form a vicious circle, which conforms to the developmental cascade model. The constructed longitudinal statistical model offers solid empirical evidence to verify such underlying mechanism. It reveals that the above variables are more than simple correlates; instead, they develop dynamic causal interconnections via intra-individual cascading effects as time elapses [11].

4.4 From Anxiety and Internet Addiction to Perceived Parental Conflict

The present research verifies that anxiety among higher vocational college students can positively predict perceived parental conflict, which coincides with outcomes from prior scholarly investigations [30]. According to the Stress Generation Theory [69], anxious individuals actively generate interpersonal stressors—their behavioral patterns elicit conflict situations that would not otherwise exist or exacerbate existing tensions. For instance, anxious individuals may engage in repeatedly seeking reassurance due to worries about parental relationships or overinterpreting parental words and actions with excessive sensitivity. These behaviors, in turn, may precipitate negative parental reactions.

According to the Cognitive Bias Theory [69], anxious individuals tend to possess negative cognitive biases, which predispose them to interpret unclear or ambiguous information negatively. In the context of family interactions, this mechanism manifests as follows: when parental behavior is ambiguous (e.g., parents remaining silent due to work fatigue), anxious adolescents are more likely to interpret it as "my parents are angry with me" or "something is wrong between my

parents". Anxious individuals tend to preferentially attend to threatening information in their environment, making them more sensitive to parents' negative emotions or signs of conflict. Additionally, they are more likely to recall past conflict events and use them as a framework for interpreting current perceptions. These cognitive biases lead to an increase in anxious individuals' subjective perception of conflict, even when the objective frequency of parental conflict remains unchanged.

Conversely, internet addiction among higher vocational college students did not significantly predict future perceived parental conflict. Research has indicated that when adolescents are immersed in internet use, their attentional switching capacity for family interactions diminishes [63, 64], meaning they are less likely to perceive and interpret conflict signals within the family sensitively. Consequently, internet addiction among higher vocational college students leads to disengagement from family interactions, rendering it unable to predict subsequent perceptions of parental conflict.

4.5 Limitations and Future Directions

While this research adopted the RI-CLPM framework and strict research procedures to yield meaningful empirical findings, several inherent limitations cannot be ignored. To begin with, though common method bias checks were performed for self-reported questionnaires, measurement results are still prone to subjective response deviations. Longitudinal investigations are constrained in introducing multi-objective assessment techniques including real-time online behavior monitoring, hence self-report measurements cannot fully avoid subjective biases even after relevant statistical correction. Next, contextual variables like campus atmosphere were not included to explore potential moderating influences in the present research. In addition, all research participants were selected from Chinese vocational college cohorts; cultural discrepancies in understanding interparental conflicts limit the extrapolation of present conclusions to Western samples. Lastly, total-scale scores from the Internet Addiction Index were exclusively adopted for statistical analysis. For this reason, the independent links between separate sub-dimensions of internet addiction and the two indicators (perceived parental conflict and anxiety) have not been clarified yet. Further empirical work utilizing factor score computation would facilitate a more refined interpretation of how distinct internet addiction forms correlate with such psychological constructs.

5 Conclusions

The current research adopted the Random Intercept Cross-Lagged Panel Model (RI-CLPM) to track longitudinal dynamic associations among perceived interparental conflict, anxiety and internet addiction within higher vocational student cohorts. After eliminating the confounding impacts of stable individual dispositional traits, analytical outcomes demonstrate that perceived parental conflict positively forecasts the emergence of anxiety and excessive online addiction in follow-up stages. While problematic internet use serves as a precursor to subsequent anxiety, it fails to significantly predict later perceived parental conflict. Meanwhile, reciprocal predictive links exist between anxiety and internet addiction.

Restricted by self-reported measurement bias and the exclusive Chinese vocational student sample, the present findings have limited cross-cultural extrapolation. Follow-up research can introduce objective behavioral monitoring indicators, explore contextual moderating variables and carry out cross-cultural empirical comparisons to optimize relevant intervention plans. Practical prevention measures ought to target interparental conflict as well as learners' inner psychological distress. Timely screening and customized intervention against anxiety are essential to interrupt the adverse cascading cycle of internet over-dependence.

Declarations

Ethics approval and consent to participate

Ethical approval for all experimental protocols was granted by the ethics committee of the School of Psychology, Jiangxi Normal University. All procedures complied with applicable guidelines and regulations, and informed consent was secured from every participant prior to their enrollment.

Consent for publication

Not applicable.

Conflicts of Interest

The authors state that no conflicts of interest are connected with the present study.

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Author Contribution

PF and JK designed the study, drafted the manuscript; PX gathered the data, performed the analysis, and interpreted the data; YB revised the manuscript and controlled the quality. All authors read and examined the final manuscript.

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Data Availability

Available with restricted access: The Ungdata surveys that support the findings of this study are available from Norwegian Social Research (NOVA), but restrictions apply to the availability of these data, which were used under licence for the current study and so are not publicly available. The data are, however, available upon request and with the permission of Norwegian Social Research (NOVA).

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Figures

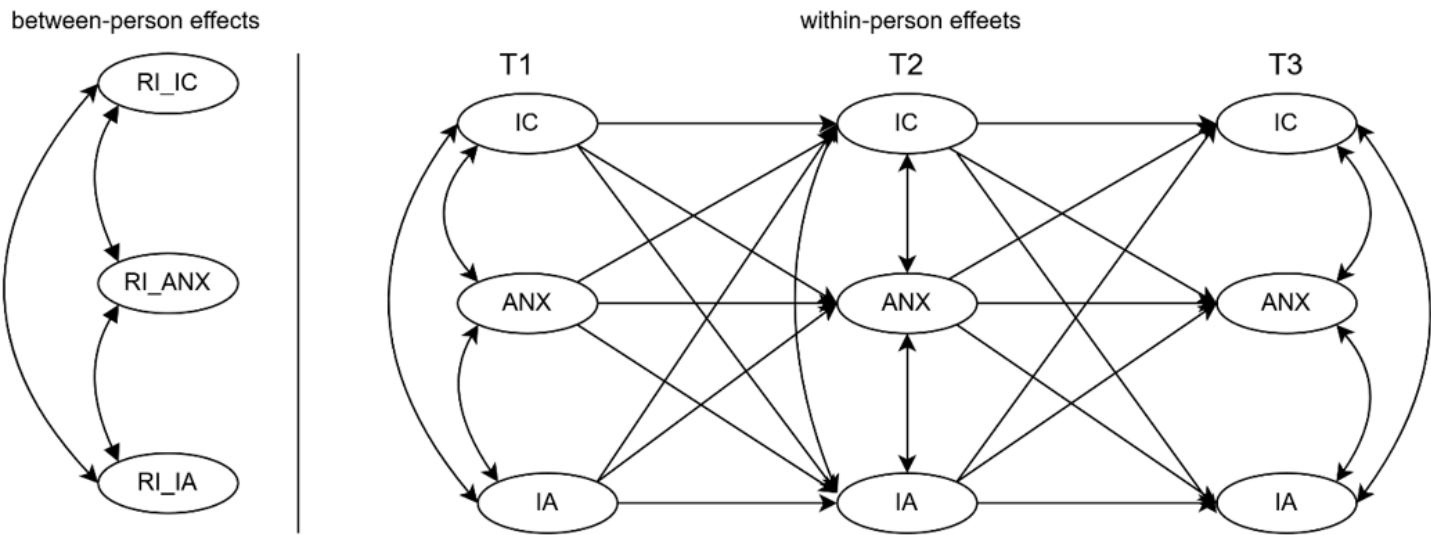


Figure 1

Hypothetical random intercept cross-lagged panel models

Note: IC=Perceived parental conflict, ANX= Anxiety, IA=Internet addiction, T1 = Time 1, T2 = Time 2, T3 =Time 3,

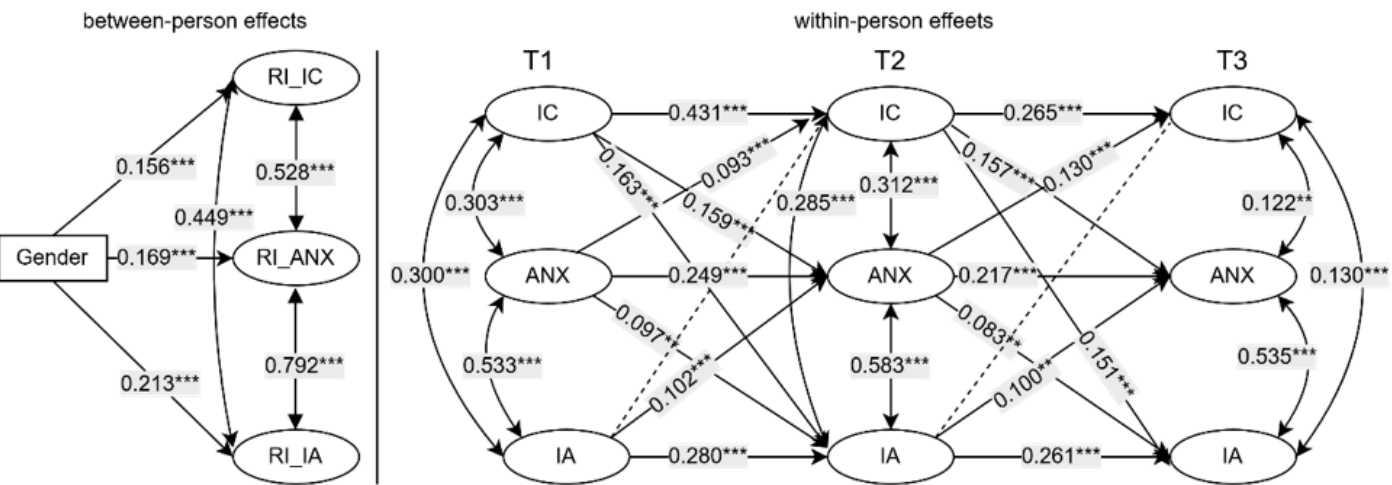


Figure 2

The random intercept cross-lagged panel model

Note: RI=Random intercept; IC=Perceived parental conflict, ANX= Anxiety, IA=Internet addiction, The figure displays standardized path coefficients. Solid lines denote statistically significant relationships, while dashed lines indicate non-significant ones. **p < 0.01, ***p < 0.001.