scientific reports

Check for updates

OPEN

Media dependency, platform-swinging, and psychological depression among young college students in the polymedia environment

Jian Wangqu[1], Zelin Xue[2✉] & Linlin Chen[1]

As a comprehensive and affordable environment, polymedia lays the groundwork for exploring platform-swinging and offers a theoretical framework for investigating its dynamics. Platform-swinging and its unique niche characteristics provide a novel lens to examine the interplay between media dependency and psychological well-being. Using a survey questionnaire, this study collected data from 1210 university students in the Yangtze River Delta, China's most economically developed region, to examine the relationship between media dependency, platform-swinging, and psychological depression. Our findings suggest that the affordances of platform-swinging influence media dependency, whereas the nature of media dependency shapes psychological depression. This study contributes to a deeper understanding of how young adults navigate various media platforms and sheds light on the complex interrelations between media use and mental health. Focusing on platform-swinging in the environment of polymedia explores the relationship between media dependency, platform-swinging, and psychological depression. Moreover, it also compensates for the one-sided understanding caused by simply examining media dependency and psychological depression. This study has practical value and theoretical significance for the psychological health of college students and the research and development of the media dependency theory.

The media dependency theory posits that audiences use media to access information, establish social networks, and fulfill specific needs, gradually developing psychological dependence. The theory's inception is rooted in three motives: understanding, orientation, and entertainment[1]. This theory can be integrated with the uses and gratifications theory, which suggests that audiences engage with media based on their cognitive and affective needs. Both theories imply a nonlinear relationship between the media and the audience[2].

As technology continues to evolve, the fundamental environment surrounding media dependency theory and its practices have undergone substantial changes, particularly with the development of social media. This development has led media dependency research to abandon the "audience passivity theory" and focus increasingly on the interactive "media-audience" relationship concerning audience psychological dependency.

However, the situation among young college students is different. Social media has deeply integrated into their daily lives, and an increasing number of college students have fallen into the quagmire of media dependence, leading to psychological depression. The reinforcement of the psychological dependence on media has led to a tendency for college students to exhibit a passive attitude toward the audience. Researchers have conducted a series of studies on the relationship between media dependency and psychological depression. However, this study breaks away from this logical framework and identifies the reasons and influencing mechanisms from the perspective of platform swing. Specifically, starting from the different causes of platform swing, it verifies whether their dependency on media is truly entirely "passive," lacking sufficient resistance and autonomy, and thus triggering mental health problems.

[1]University of Shanghai for Science and Technology, Shanghai 200093, China. [2]Institute of Politics and Public Administration, Shanghai Academy of Social Sciences, Shanghai 200020, China. ✉email: xuezelin@126.com

Literature review

Existing literature has predominantly focused on the linear deviation in causal relationships between media dependency and psychological depression among young university students. There is a lack of examination and understanding of this demographic's motivations and modalities of media usage, thereby overlooking the value and emotional connections between "media" and "audience." Indeed, media usage is not random or unconscious but a purposeful and actively chosen behavior. In this regard, the media dependency theory thoroughly considers the primary motivations behind people's media usage and the reasons for choosing specific media. Individuals are inclined to select media that fulfills their needs. Comprising many media, the media environment can be understood as a "composite structure." For such environments, the concept of affordance, originally derived from the field of environmental ecology, has been expanded to communication studies[3] and is considered a relational attribute between subject and object[4]. Rice[5] proposed the concept of media affordance from a balanced perspective between media determinism and audience perception. The author believes that audiences can use one or more media to take action in a specific context based on the characteristics, abilities, or limitations of the media, starting from their own needs or purposes. In this structure, each medium or platform is defined in relational terms concerning all other media rather than focusing on independent technologies and media. When users express emotions and manage media relationships relying on different media based on their features, the navigation of this environment becomes particularly significant in interpersonal media communication[6]. This composite, holistic "availability" of the media environment is understood as a polymedia environment when the intervention, costs, and media literacy are weakened or even eliminated to satisfy the three fundamental premises of "accessibility," "openness," and "tolerability"[7].

The variability in media's basic functions and mechanisms determines the degree of availability. Therefore, in a polymedia environment, users differentiate their positioning among different media[8]; this differentiation is reflected through distance at the psychological level. This psychological distance establishes an interactive order within the polymedia environment and is a projection of users' group social relations networks. As opposed to real social relationships, such "parasocial relationships" constructed in a polymedia environment may serve as compensation for real social interactions in specific contexts[9]. The strength of "parasocial relationships" is related to the audience's media experience and willingness to participate in the future[10], including cognitive trust and perceived value toward media[11]. Within this interactive order, users manage multiple media[12]. The phenomenon of constantly switching back and forth between multiple social media platforms is termed "platform-swinging"[13].

The phenomenon of "platform-swinging" operates under certain premises. First, users use multiple media platforms and frequently switch between them. However, this switching differs from "media migration," where users abandon previous media for another[14], as it involves building a cognitive understanding of one platform upon the cognition of prior platforms, constituting a strategy of polymedia allocation[15]. Additionally, different platforms have distinct positioning, including user identification, and belongingness is influenced by the overall service quality of social media platforms[16], which determines the variations in their usage patterns[17]. This trend of "swinging" between platforms is increasingly strengthening and gradually becoming a norm[18].

The emergence of a polymedia environment lays the foundation for platform-swinging behavior, which is the behavioral representation of users in a polymedia environment. This phenomenon provided a research context for subsequent studies. Effectively allocating and managing different interactive strategies in a polymedia environment is a crucial and challenging task, especially for young university students born and raised in the digital age and proficient in using digital devices and technologies. Moreover, the natural logic between the polymedia environment and platform-swinging provides a more rational and updated perspective on media dependency and psychological depression among young university students. However, little attention has been paid to the impact of platform-swinging behavior among young university students and issues of attention allocation.

Research hypotheses

Media dependency has gradually become a collective social phenomenon in a polymedia environment[19]. Issues such as problematic and excessive use have triggered widespread anxiety[20], which has led to pathological media dependency[21]. In the 1990s, this addictive form of media dependency began to receive attention[22]. Some studies have shown that excessive media dependency can lead to psychological phenomena such as depression[23,24]. Similarly, for young college students, the frequent use of social media may lead to depression, anxiety, and post-traumatic stress[25]. Ample empirical data suggest that the increased use of social media among young college students is associated with higher levels of anxiety and psychological distress[26]. Pei[27] tested the psychological state of college students who used social media extensively and found that students who were overly dependent on social media generally had higher levels of depression than their peers. Furthermore, the more severe the depressive mood, the more likely individuals are to experience fear of missing out[28]. The effects and types of media dependency can be divided into three categories. The first category, surveillance effect, is where young college students rely on media to obtain information about the social environment they need. The second, social utility, is where they obtain effective and meaningful satisfaction in social spaces through media dependency[29]. Finally, the third, fantasy escape, is where they meet the need to escape from the real world[30]. Lee and Choi[31] adopted a more detailed approach, dividing media dependency into six types: personal understanding, solitary play, personal action orientation, interactive play, social understanding, and social action orientation. Among them, personal entertainment motives are related to escapism, which has been validated as a factor leading to social media dependency and addiction[32]. These findings suggest that different types of media dependency may have different nonlinear relationships with depression. The extensive studies and analyses mentioned above show that media dependency has explicit and implicit distinctions. For example, young college students who rely on some utility-based social media for their daily learning needs fundamentally differ from those who spend much time on social media to shape a "multi-faceted persona" to satisfy their psychological and social needs. The resulting

impact on the psychological level is also different. Therefore, we categorized media dependency into functional and affective media dependency and proposed the following hypotheses:

H1: Affective media dependency positively affects depression among young college students.

H2: Functional media dependency positively affects depression among young college students.

In today's polymedia environment, young university students rely predominantly on social media as their preferred medium for communicating. Media dependency can lead to positive or negative cognitive and affective states[33]. From the above analysis, it can be inferred that the most crucial factor when young college students engage in strategic media use in a polymedia environment is making judgments about media availability. If a medium does not meet their needs, they switch to another medium. Additionally, user behavior varies across social media platforms[34]. Therefore, diverse objectives and needs can be fulfilled by combining various social media platforms[35]. Platform-swinging acts as a "mirror," with this prominent factor regarded as a moderating variable. Thus, we proposed the following hypotheses:

H3: Affective media dependency positively affects platform-swinging among young college students.

H4: Functional media dependency positively affects platform-swinging among young college students.

H5: Platform-swinging behavior mediates the relationship between affective media dependency and psychological depression among young college students.

H6: Platform-swinging behavior mediates the relationship between functional media dependency and psychological depression among young college students.

Materials and methods
Data and methods

A survey questionnaire served as the data collection tool. The experimental protocol was approved by the Ethics Committee of East Hospital affiliated with the University of Shanghai for Science & Technology. To account for the impact of the economic level and digital divide resulting from economic factors[36,37], the Yangtze River Delta—China's most economically developed region— was selected as the research area. Young university students from this region were chosen for the survey to collect longitudinal data over a specified period. The research spanned 48 days, starting from August 2024; preliminary investigations were conducted during the first 13 days, and formal research was undertaken over the remaining 35 days.

The first part of the survey collected basic information about the respondents and investigated their media dependency and platform-switching behavior using a questionnaire[38]. The last part assessed the respondents' psychological depression using the brief and accurate K6 screening scale[39]. The Emotional and Functional Media Dependence Scales each contain four questions. The affective media dependence questions assessed four dimensions: "In the last month, I have used affective social media (e.g., Xiaohongshu, Douyin, Kuaishou, Weibo, etc.) very frequently (AMD-1)"; "the duration of daily use is very long (AMD-2)"; "I am dependent on these affective social media to a high degree (AMD-3)"; and "I repeated switch between multiple affective social media every day (AMD-4)." Similarly, the assessment of functional media dependence consisted of four questions: "the frequency of using functional social media (e.g., DingTalk/Feishu, VooV Meeting, e-mail, Kingsoft documents, etc.) in the recent year in the last month is high (FMD-1)"; "the time of using them every day is very long (FMD-2)"; "the extent to which I rely on these functional social media is high (FMD-3)"; and "I repeatedly switch between multiple functional social media on a daily basis (FMD-4)." The three questions regarding platform-switching behavior included "In the last month, I have often used multiple social APPs at the same time in my daily life (PS-1)"; "I switch back and forth between multiple social APPs while using my cell phone (PS-2)"; and "I switched back and forth between a number of different social APPs, but I do not stop using any of them (PS-3)." The K6 Psychological Depression Screening Scale consists of 6 questions (LPD-1 to LPD-6) that assess the respondents' level of psychological depression from 6 different perspectives. These are, "In the past 30 days, you have felt tense, despair, irritable, frustrated, that you're your efforts are in vain, that life is not worth it" for example, and so on.

The study conducted preliminary research and a formal survey to ensure accuracy and reliability. During the preliminary phase, 157 questionnaires were administered, yielding 152 valid responses after screening and cleaning. These preliminary data provided insights into the respondents' basic characteristics and attitudes, which informed sample selection and questionnaire design for the formal survey phase. In the formal survey phase, the sample size was expanded by administering 1,242 questionnaires, resulting in 1,210 valid responses. These data effectively reflected the true situation of the participants, supporting subsequent data analysis and enhancing the reliability of the results. The SPSS23.0 software was used to conduct a reliability analysis on the valid pre-survey data collected, and the Cronbach coefficient was used to assess the credibility of the pre-survey questionnaire. Subsequently, validity analysis was conducted using the Kaiser–Meyer–Olkin (KMO) test, total variance explanation, and the rotated component matrix table[40]. The results of the pre-survey reflected the basic characteristics of the sample and the good credibility and structural validity of the questionnaire, which provided a basis for the sample selection and questionnaire design in the formal survey stage. Then, the SPSS23.0 software was used to conduct sample population analysis, descriptive analysis of research variables (maximum value, minimum value, mean, and standard deviation), and reliability analysis (Cronbach coefficient) on the formal research data. The confirmatory factor analysis (CFA) (model fitness, discriminant validity, and convergent validity) and structural equation modeling were used to test the proposed research hypotheses[41] using AMOS26.0 software.

Results
Preliminary Research
This study was conducted in accordance with the recommendations of the World Medical Association's Declaration of Helsinki. Prior to participation in this study, all participants provided their consent and were informed of their right to have their information protected.

Descriptive analysis
Among the 152 valid responses received in the preliminary research, the gender distribution of the participants was nearly balanced, with a ratio close to 1:1. The participants' ages were predominantly between 18 and 26 years, and the majority resided in Shanghai and Jiangsu Provinces. Regarding educational level, most were pursuing undergraduate or master's degrees, primarily in engineering, science, and management. In terms of daily media consumption, the vast majority used social media, with a significant proportion engaging in traditional media. Additionally, most participants reported high functional and affective social media usage.

Reliability analysis
Cronbach's alpha was used to evaluate the scale's reliability and assess the consistency and stability of the measurements. Furthermore, corrected item-total correlations and Cronbach's coefficients were analyzed after item deletion. The reliability assessment of the dependent variable indicated a coefficient of 0.862, surpassing the 0.8 threshold. Each item's corrected item-total correlation exceeded 0.3, and the Cronbach's coefficient after item deletion was below 0.862, indicating no need to remove any scale items. Hence, assuming good data reliability in this preliminary study is reasonable.

Exploratory factor analysis
KMO and Bartlett's Test of Sphericity were conducted to assess the accuracy and applicability of the concepts covered by the scale. The results of the above 2 tests showed a KMO value of 0.842, surpassing the 0.5 threshold, and Bartlett's Test of Sphericity showed significance at 0.000, below 0.05. Thus, the data from this survey demonstrated good validity.

Harman's single-factor test was conducted to check for significant common method bias in the scale data. The variance percentage before rotation of the first factor was 34.577%, below the 40% threshold, suggesting no significant common method bias in this research data.

The results of the rotated factor-loading matrix demonstrated clear factor loadings. Questions 1 through 6 on psychological depression loaded highly on the first factor; questions 1 through 4 on affective media dependency loaded highly on the second factor; questions 1 through 4 on functional media dependency loaded highly on the third factor; and questions 1 through 3 on platform-swinging behavior loaded highly on the fourth factor. With all these loadings exceeding 0.5, the scale demonstrated good validity in its factor structure, making it well-suited for further formal research and analysis.

Formal research
Descriptive analysis
Among the 1210 valid responses obtained in the formal study, the gender ratio, age distribution, place of residence, and educational stage of respondents mirrored those observed in the preliminary study. However, in contrast to the preliminary study, the respondents in the formal study were predominantly from engineering, science, and medicine. Formal research has revealed that respondents concurrently engage with a greater number of social media platforms.

Reliability analysis
A reliability assessment of each research variable in the formal study was conducted. The reliabilities of functional media dependency, affective media dependency, platform-swinging behavior, and degree of psychological depression were 0.843, 0.865, 0.837, and 0.905, respectively, and their overall reliability was 0.796. These figures surpass the threshold of 0.7, indicating robust data reliability for formal research.

CFA
The AMOS software was employed to evaluate the suitability and accuracy of the test model and conduct a validation factor analysis of each variable. The key assessment parameters included the KMO value, model fitness, discriminant validity, and convergent validity.

The KMO method and Bartlett's Test of Sphericity were employed to evaluate the formal research scale data appropriateness for factor analysis. The KMO value of 0.807 and the statistically significant Bartlett's test result ($0.000 < 0.05$) affirm the suitability of the data for factor analysis.

The measurement model fitness was verified. The chi-square degree of freedom ratio was 1.851, which is lower than the standard value of 3, and the RMSEA was 0.027, which is less than 0.1. Moreover, the CFI, IFI, TLI, and NFI values were 0.991, 0.991, 0.990, and 0.982, respectively, all greater than 0.9. Therefore, it can be concluded that the measurement model has a better degree of fitness and can explain and predict the data better.

The convergent and discriminant validities of the measurement models were examined to evaluate the instruments' quality and validity (Table 1). The results indicated that the construct reliability (Cronbach's alpha, CR) values for functional media dependency, affective media dependency, platform-swinging behavior, and psychological depression were all above 0.7. Furthermore, the average variance extracted (AVE) values exceeded 0.5, indicating good convergent validity of the measurement model. The discriminant validity of the measurement model was also examined. The square root of the AVE for functional media dependency

	CR	AVE	Functional media dependency	Affective media dependency	Platform-swinging	Psychological depression
Functional media dependency	0.852	0.599	0.774			
Affective media dependency	0.873	0.635	0.028	0.797		
Platform-swinging	0.854	0.666	0.062*	0.104***	0.816	
Psychological depression	0.907	0.622	0.009	0.122***	0.093**	0.789

Table 1. Test model validation results. * $p < .05$, ** $p < .01$, and *** $p < .001$; old diagonal numbers are the AVE square root of the variable, and off-diagonal numbers are the correlation coefficients between variables.
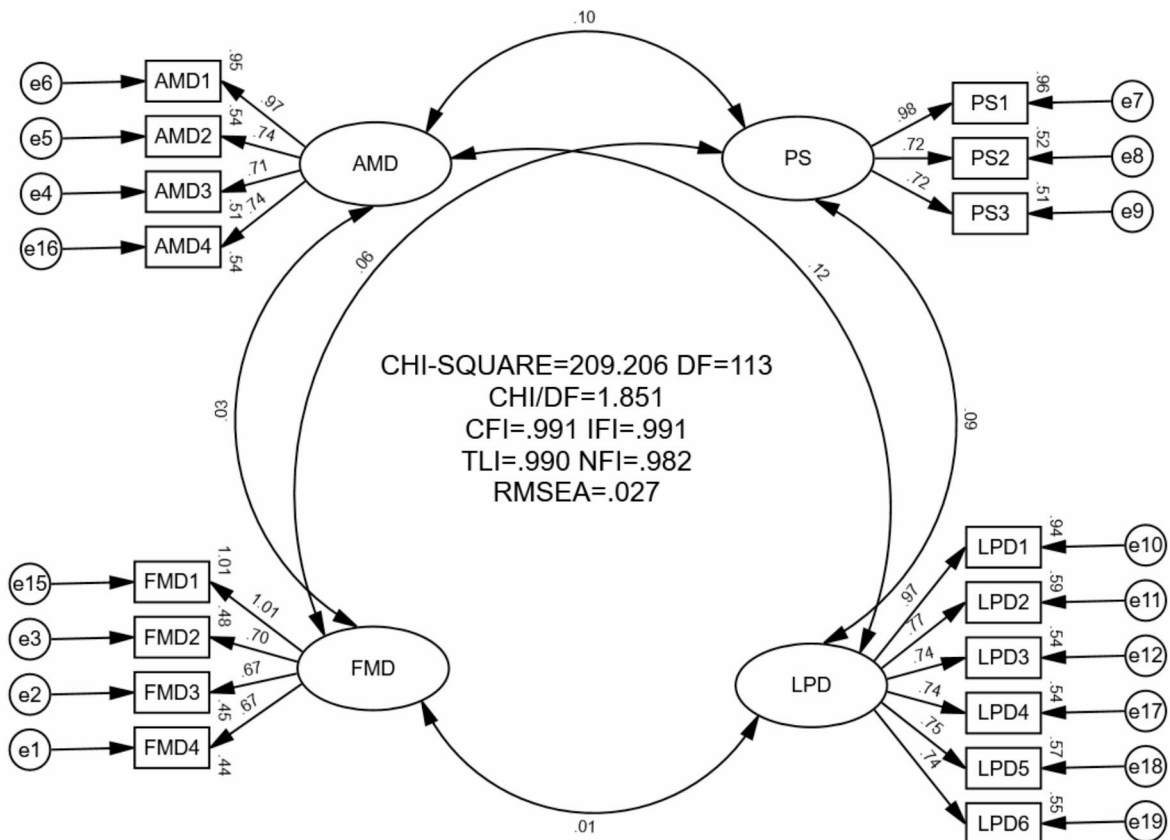
Fig. 1. Confirmatory factor analysis measurement model diagram.

surpassed the correlation coefficient of 0.062 for platform-swinging behavior. Similarly, the square root of the AVE for affective media dependency was higher than the correlation coefficient of 0.122 for the degree of psychological depression. Additionally, the square root of the AVE for the platform-swinging behavior exceeded the correlation coefficient of 0.093. Finally, the square root of AVE for the degree of psychological depression was 0.789. Collectively, these outcomes suggest the robust discriminant validity of the measurement model.

The final CFA measurement model is shown in Fig. 1.

Structural equation modeling

The fit indices of the structural model are as follows: the chi-square degree of freedom ratio was 1.851, which is lower than the standard value of 3, and the RMSEA was 0.027, which is less than 0.1. Moreover, the CFI, IFI, TLI, and NFI values were 0.991, 0.991, 0.990, and 0.982, respectively, all greater than 0.9. Therefore, the structural model also exhibited good fit validity.

The evaluation of path coefficients in the structural model is presented in Table 2. The unstandardized path coefficient of functional media dependency on platform-swinging behavior was 0.031, greater than 0. Additionally, it had a significant p-value of 0.042 (< 0.05), supporting the hypothesis that "functional media dependency has a positive effect on platform-swinging behavior among young college students" (H4). Similarly,

Path			Estimate	S.E.	C.R.	P
Platform-Swinging	←	Functional Media Dependency	0.031	0.015	2.032	0.042*
Platform-Swinging	←	Affective Media Dependency	0.100	0.029	3.388	0.000***
Psychological Depression	←	Functional Media Dependency	0.001	0.029	0.045	0.964
Psychological Depression	←	Affective Media Dependency	0.209	0.056	3.755	0.000***
Psychological Depression	←	Platform-Swinging	0.153	0.057	2.703	0.007**

Table 2. Evaluation results of structural model path coefficients. * $p < .05$, ** $p < .01$, *** $p < .001$.

Path	Estimate	SE	Lower	Upper	P
M1: Functional Media Dependency → Platform-Swinging Behavior → Level of Psychological Depression	0.005	0.003	−0.0001	0.0118	0.056
M2: Affective Media Dependency → Platform-Swinging Behavior → Level of Psychological Depression	0.015	0.009	0.0022	0.0349	0.014

Table 3. Mesomeric effect test results.

the unstandardized path coefficient of affective media dependency on platform-swinging behavior was 0.100, greater than 0. It also had a highly significant p-value (< 0.001), indicating that the hypothesis that "affective media dependency has a positive effect on platform-swinging behavior among young college students" (H3) is valid. The unstandardized path coefficient for functional media dependency on the degree of psychological depression was 0.001, greater than 0. However, it had a non-significant p-value of 0.964 (> 0.05), indicating that the hypothesis "functional media dependency has a positive impact on psychological depression among young college students" (H2) is not valid.

By contrast, the unstandardized path coefficient of affective media dependency on the degree of psychological depression was 0.209, which was greater than 0. It also had a highly significant p-value of less than 0.001, indicating that the hypothesis "affective media dependency has a positive impact on psychological depression among young college students" (H1) is valid.

Furthermore, the unstandardized path coefficient of platform-swinging behavior on the level of psychological depression was 0.153, which was greater than 0. It also had a significant p-value of 0.007 (< 0.05), supporting the hypothesis that "the platform-swinging behavior of adolescent college students had a significant positive effect on the level of psychological depression."

The mediation hypothesis was tested using the bootstrap method with 5,000 self-samples, as shown in Table 3. The coefficient of the mediation path from the functional media dependency of young college students affecting the degree of psychological depression through platform-swinging behavior was 0.005, with a non-significant statistical path ($0.556 > 0.05$). Therefore, the hypothesis that "platform-swinging behavior mediates the relationship between functional media dependency and psychological depression among young college students" (H6) is not supported. Conversely, the mediating path coefficient of the affective media dependency of young college students through platform-swinging behavior affecting the level of psychological depression was 0.015. The 95% confidence interval ranged from 0.0022 to 0.0349, with a statistically significant p-value of 0.014 (< 0.05), indicating that the hypothesis that "platform-swinging behavior mediates the relationship between affective media dependency and psychological depression among young college students" (H5) is valid.

Based on the results of the above analysis, the final structural model is shown in Fig. 2.

Discussion and conclusion

This study conducted an empirical survey on 1210 young college students from the Yangtze River Delta, China's most economically developed region, to explore the complex relationship between media dependency, platform-swinging, and psychological depression in a polymedia environment. Significant differences were observed in the impact of media dependency on psychological depression. Specifically, affective media dependency has a positive effect on psychological depression, while functional media dependency has no significant impact on psychological depression. In addition, both affective and functional media dependency positively impact platform-swinging behavior. Further analysis showed that platform-swinging behavior plays a significant mediating role between affective media dependency and psychological depression. In contrast, no mediating effect is observed between functional media dependency and psychological depression.

First, the results of the empirical study support the relationship between media dependency and depression among young college students, which is consistent with the conclusion verified by Mote[42] and Xiao et al.[43]. However, in this study, two diametrically opposed conclusions are drawn by dividing the role and type of media dependency, namely, H1 is supported, while H2 is not. In the polymedia environment, owing to the differences in media affordances, attention should be paid to the correlation between the characteristics or patterns of use of different media and psychological depression among young college students, as supported by Escobar-Viera et al.[44].

Second, the idea that both affective and functional media dependency have a positive impact on young college students' platform-swinging behavior was validated, in line with the findings of Thorisdottir et al.[45] and Brunborg et al.[46]. There is a link between media use intention and platform-swinging, and when users tend to swing between platforms, satisfying different needs is crucial[47]. This result implies that when young college
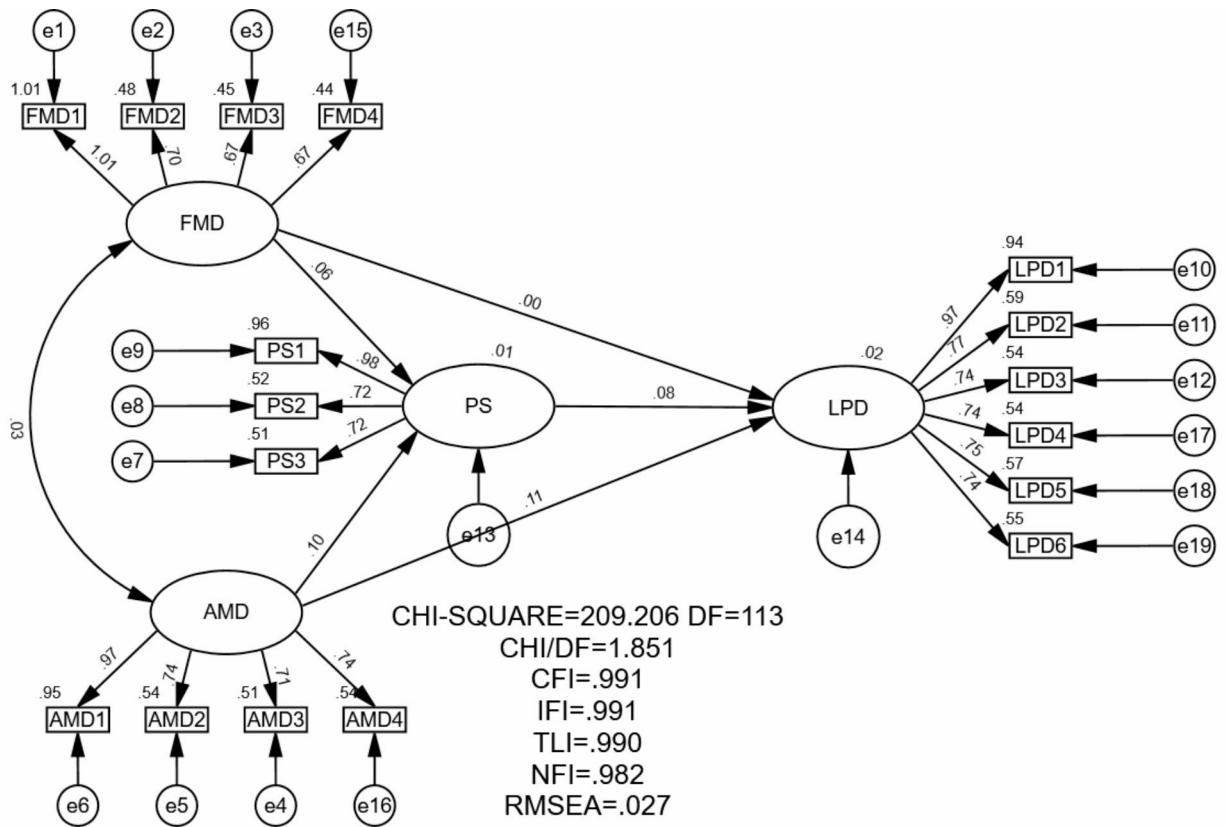
Fig. 2. Path diagram of the research model. Note: The path coefficients in the figure are all unstandardized.

students use media strategically, regardless of media use intention and media dependence, media platform swing is a process of media affordance judgment.

Finally, this study has confirmed that platform swing is not unique to young college students but is common across all age groups[48]. In this study, the mediating path coefficient of affective media dependency affecting the degree of psychological depression through platform-swinging behavior was 0.015, with a 95% confidence interval of 0.0022 to 0.0349 and a significance p-value of 0.0135 < 0.05, which supported H5. However, the situation was diametrically opposite for functional media dependency. Platform-swinging had no mediating effect on the relationship between functional media dependency and psychological depression level. Although users who spend more time on social media and engage in frequent platform-swinging behaviors have higher scores on depression and anxiety[49], the phenomenon of platform-swinging is only a dominant feature of media dependency. Hence, it is not possible to judge whether it triggers depression or mediates the relationship between media dependency and psychological depression simply from the frequency of platform-swinging alone. More attention needs to be paid to the mediating effect between media dependency and psychological depression. Focusing on the type of intention behind platform-swinging is crucial; doing so is the primary contribution of this study.

This study empirically investigated the complex nonlinear relationship between media dependence, platform-swinging, and psychological depression among young college students, indicating that the degree of media dependency is not always positively correlated with psychological depression. This association varies depending on the type of media dependency. Similarly, the mediating role of platform-swinging behavior in the relationship between media dependency and psychological depression depends on the type of media dependency. The channel complementarity and optimal stimulation level theories offer valuable insights into this phenomenon. Channel complementarity theory posits that complementary relationships exist between different channels, analogous to the diverse social media platforms used today. Consequently, complementary relationships may exist between platforms.

The optimal stimulation level theory positively influences the complementarity of the need for interpersonal communication, self-expression, information, and entertainment. However, only the complementarity of the need for interpersonal communication and information significantly affects users' intentions to use multiple social media platforms[50]. In many cases, social media platforms that cater to users' diverse and similar psychological needs are complementary rather than substitutable[51].Therefore, whether media dependence leads to psychological depression is not necessarily moderated by the degree of platform-swinging. Instead, it ultimately depends on the specific needs that young college students' use of polymedia aims to fulfill.

The vital contribution of this study lies in its focusing on the different types of media dependency. This approach reveals the differences in the impact of various types of media dependency on psychological depression, expands the theoretical framework of the relationship between media dependency and psychological depression, and provides empirical support for the further enrichment and development of media dependency theory. In addition, this study emphasizes the importance of the motivation behind platform-swinging behavior for understanding its psychological impact. Doing so, it goes beyond the single dimension of media dependency, providing a new perspective for understanding the relationship between media dependency and psychological depression in polymedia environments. Finally, the results of this study have important theoretical value and practical significance for the mental health education of young college students, providing a scientific basis for the development of effective mental health intervention measures.

Data availability

The datasets generated and/or analysed during the current study are not publicly available due to the policies and confidentiality agreements adhered to in our research institute, but are available from the corresponding author on reasonable request.

References

1. Defleur, M. L. & Ball-Rokeach, S. *Theories of mass Communication* (Longman, 1989).
2. Loges, W. E. & Ball-Rokeach, S. J. Dependency relations and newspaper readership. *J. Q.* **70**, 602–614 (1993).
3. Wellman, B. et al. The social affordances of the internet for networked individualism. *J. Comput. -Mediat Commun.* **8**, JCMC834 (2003).
4. Gibson, J. J. *The Senses Considered as Perceptual Systems* (Bloomsbury Academic, 1966).
5. Rice, R. E. et al. Organizational media affordances: operationalization and associations with media use. *J. Commun.* **67**, 106–130 (2017).
6. Madianou, M. Smartphones as polymedia. *J. Comput. -Mediat Commun.* **19**, 667–680 (2014).
7. Madianou, M., Miller, D. & Polymedia Towards a new theory of digital media in interpersonal communication. *Int. J. Cult. Stud.* **16**, 169–187 (2013).
8. Gershon, I. *The Breakup 2.0: Disconnecting over new Media* (Cornell University Press, 2010).
9. Stein, J. P., Liebers, N. & Faiss, M. Feeling better… but also less lonely? An experimental comparison of how parasocial and social relationships affect people's well-being. *Mass. Commun. Soc.* **27**, 576–598 (2022).
10. Stein, J. P., Linda Breves, P. & Anders, N. Parasocial interactions with real and virtual influencers: the role of perceived similarity and human-likeness. *New. Media Soc.* **26**, 3433–3453 (2024).
11. Pang, H. & Liu, Y. Untangling the effect of cognitive trust and perceived value on health-related information seeking, sharing and psychological well-being: motivations sought perspective. *Telemat Inf.* **79**, 101964 (2023).
12. Alhabash, S. & Ma, M. A tale of four platforms: motivations and uses of Facebook, Twitter, Instagram, and Snapchat among college students? *Soc. Media Soc.* 3 (2017).
13. Tandoc, E. C. Jr., Lou, C. & Min, V. L. H. Platform-swinging in a poly-social-media context: how and why users navigate multiple social media platforms. *J. Comput. -Mediat Commun.* **24**, 21–35 (2019).
14. Kumar, S., Zafarani, R. & Liu, H. Understanding user migration patterns in social media. *Proc. Twenty-Fifth AAAI Conf. Artif. Intell.* **25**, 1204–1209 (2011).
15. Bolter, J. D. & Grusin, R. *Remediation: Understanding new Media* (MIT Press, 1999).
16. Pang, H. & Zhang, K. Determining influence of service quality on user identification, belongingness, and satisfaction on mobile social media: insight from emotional attachment perspective. *J. Retail Consum. Serv.* **77**, 103688 (2024).
17. Boczkowski, P. J., Matassi, M. & Mitchelstein, E. How young users deal with multiple platforms: the role of meaning-making in social media repertoires. *J. Comput. -Mediat Commun.* **23**, 245–259 (2018).
18. Hutchby, I. Technologies, texts and affordances. *Sociology* **35**, 441–456 (2001).
19. Ahn, J. & Jung, Y. The common sense of dependence on smartphone: a comparison between digital natives and digital immigrants. *New. Media Soc.* **18**, 1236–1256 (2016).
20. Haug, S. et al. Smartphone use and smartphone addiction among young people in Switzerland. *J. Behav. Addict.* **4**, 299–307 (2015).
21. Giraldo-Luque, S., Afanador, A., Fernández-Rovira, C. & P. N. & The struggle for human attention: between the abuse of social media and digital wellbeing. *Healthcare* **8**, 497 (2020).
22. OReilly, M. Internet addiction: a new disorder enters the medical lexicon. *CMAJ: Can. Med. Assoc. J.* **154**, 1882–1883 (1996).
23. Augner, C. & Hacker, G. W. Associations between problematic mobile phone use and psychological parameters in young adults. *Int. J. Public. Health.* **57**, 437–441 (2012).
24. Tong, W. & Meng, S. Effects of physical activity on mobile phone addiction among college students: the chain-based mediating role of negative emotion and e-health literacy. *Psychol. Res. Behav. Manag.* **16**, 3647–3657 (2023).
25. Chen, S., Li, H., Pang, L. & Wen, D. The relationship between social media use and negative emotions among Chinese medical college students: the mediating role of fear of missing out and the moderating role of resilience. *Psychol. Res. Behav. Manag.* **16**, 2755–2766 (2023).
26. Lambert, J., Barnstable, G., Minter, E., Cooper, J. & Mcewan, D. Taking a one-week break from social media improves well-being, depression, and anxiety: a randomized controlled trial. *Cyberpsychology Behav. Soc. Netw.* **25**, 287–293 (2022).
27. Pei, J. Prediction and analysis of contemporary college students' mental health based on neural network. *Comput. Intell. Neurosci.* 7284197 (2022). (2022).
28. Pang, H. & Quan, L. Assessing detrimental influences of fear of missing out on psychological well-being: the moderating role of self-presentation, upward contrast, and social media stalking. *Appl. Res. Qual. Life.* **19**, 881–904 (2024).
29. Zhan, S., Shrestha, S. & Zhong, N. Romantic relationship satisfaction and phubbing: the role of loneliness and empathy. *Front. Psychol.* **13**, 967339 (2022).
30. [30] Jung, J. Y. & Media dependency theory in *The international encyclopedia of media effects* (ed. Rössler, P.) 1–10 (Wiley-Blackwell, 2017).
31. Lee, J. & Choi, Y. Informed public against false rumor in the social media era: focusing on social media dependency. *Telemat Inf.* **35**, 1071–1081 (2018).
32. Kim, H. K. & Davis, K. E. Toward a comprehensive theory of problematic internet use: evaluating the role of self-esteem, anxiety, flow, and the self-rated importance of internet activities. *Comput. Hum. Behav.* **25**, 490–500 (2009).

33. Wu, M. What drives people to share misinformation on social media during the COVID-19 pandemic: a stimulus-organism-response perspective. *Int. J. Environ. Res. Public. Health*. **19**, 11752 (2022).
34. Davenport, S. W., Bergman, S. M., Bergman, J. Z. & Fearrington, M. E. Twitter versus Facebook: exploring the role of narcissism in the motives and usage of different social media platforms. *Comput. Hum. Behav.* **32**, 212–220 (2014).
35. Huang, S. L. & Chang, C. Y. Understanding how people select social networking services: media trait, social influences and situational factors. *Inf. Manag.* **57**, 103323 (2020).
36. Claro, M., Cabello, T., San Martín, E. & Nussbaum, M. Comparing marginal effects of Chilean students' economic, social and cultural status on digital versus reading and mathematics performance. *Comput. Educ.* **82**, 1–10 (2015).
37. Forenbacher, I., Husnjak, S., Cvitić, I. & Jovović, I. Determinants of mobile phone ownership in Nigeria. *Telecommun Policy*. **43**, 101812 (2019).
38. Lu, X. Y., Xu, J., Zhang, H. & Gao, J. X. Research on user swing behavior in the environment of multiple social media platforms: an exploration based on grounded theory. *Inf. Stud. : Theory Appl.* **45**, 127 (2022).
39. Furukawa, T. A., Kessler, R. C., Slade, T. & Andrews, G. The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. *Psychol. Med.* **33**, 357–362 (2003).
40. Wu, M-L. *Practice of Statistical Analysis of questionnaires—SPSS Operation and Application* (Chongqing University, 2010).
41. Qiu, H. & Lin, B-F. *Principles and Applications of Structural Equation Modeling* (China Light Industry, 2009).
42. Mote, J., Gard, D. E., Gonzalez, R. & Fulford, D. How did that interaction make you feel? The relationship between quality of everyday social experiences and emotion in people with and without schizophrenia. *PloS One*. **14**, e0223003 (2019).
43. Xiao, W., Peng, J. & Liao, S. Exploring the associations between social media addiction and depression: attentional bias as a mediator and socio-emotional competence as a moderator. *Int. J. Environ. Res. Public. Health*. **19**, 13496 (2022).
44. Escobar-Viera, C. G. et al. For better or for worse? A systematic review of the evidence on social media use and depression among lesbian, gay, and bisexual minorities. *JMIR Mental Health*. **5**, e10496 (2018).
45. Thorisdottir, I. E., Sigurvinsdottir, R., Asgeirsdottir, B. B., Allegrante, J. P. & Sigfusdottir, I. D. Active and passive social media use and symptoms of anxiety and depressed mood among Icelandic adolescents. *Cyberpsychol Behav. Soc. Netw.* **22**, 535–542 (2019).
46. Brunborg, G. S. & Burdzovic, A. J. Increase in time spent on social media is associated with modest increase in depression, conduct problems, and episodic heavy drinking. *J. Adolesc.* **74** (2019).
47. Song, X. & Yu, Z. A qualitative research on usage intention and platform swinging behavior of anonymous social applications soul. *Behav. Sci.* **12**, 230 (2022).
48. Chemnad, K., Aziz, M., Belhaouari, S. B. & Ali, R. The interplay between social media use and problematic internet usage: four behavioral patterns. *Heliyon* **9**, e15745 (2023).
49. Zubair, U., Khan, M. K. & Albashari, M. Link between excessive social media use and psychiatric disorders. *Ann. Med. Surg.* **85**, 875–878 (2023).
50. Gu, R., Oh, L. B. & Wang, K. Multi-homing on SNSs: the role of optimum stimulation level and perceived complementarity in need gratification. *Inf. Manag.* **53**, 752–766 (2016).
51. Wang, C., Zhou, R. & Lee, M. K. O. can loyalty be pursued and achieved? An extended RFD model to understand and predict user loyalty to mobile apps. *J. Assoc. Inf. Sci. Technol.* **72**, 824–838 (2021).

Author contributions

J. wrote the main manuscript text and J.Z. revised the manuscript. J. for methodology and Z. for the quantitative research part and L prepared figures and tables and all assistant work. All authors reviewed the manuscript.

Declarations

Competing interests

The authors declare that they have no competing interests.

Additional information

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.