Postprint: A Study on the Causes and Impact Pathways of Digital Stress Among Social Media Users

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Abstract

Purpose/Significance: This study investigates the influencing factors and underlying mechanisms of digital stress among social media users, aiming to deepen understanding of digital stress formation pathways and provide references for mitigating user digital stress. Method/Process: Twenty-one users were selected as interview participants; interview data were coded to construct a theoretical model. Using fuzzy-set Qualitative Comparative Analysis (fsQCA) and based on 262 questionnaire responses, the formation pathways of digital stress among social media users were explored. Results/Conclusion: The influencing factors of digital stress among social media users include nine elements: excessive use, technological intrusion, information overload, communication load, fear of missing out, approval anxiety, social expectations, digital coping skills, and self-control. These are categorized into four dimensions: technical, social, environmental, and personal characteristics. There are six formation pathways for digital stress. Excessive use and fear of missing out are key factors leading to high digital stress, while technological intrusion and information overload are important conditions for its generation. The effects of digital coping skills and self-control are not significant.

Full Text

Research on the Causes and Influence Paths of Digital Stress Among Social Media Users

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Abstract

[**Purpose/Significance**] This study explores the influencing factors and mechanisms of digital stress among social media users to deepen understanding of digital stress formation pathways and provide reference for alleviating user digital stress. [**Method/Process**] We selected 21 users for semi-structured interviews, coded the interview data, and constructed a theoretical model. Using fuzzy-set qualitative comparative analysis (fsQCA) based on 262 questionnaire responses, we explored the formation paths of digital stress among social media users. [**Results/Conclusions**] Nine influencing factors were identified: overuse, technology intrusion, information overload, communication load, fear of missing out, approval anxiety, social expectation, digital coping skills, and self-control. These were categorized into four dimensions: technology, social, environment, and personal characteristics. Six pathways lead to digital stress formation, among which overuse and fear of missing out are key factors causing high digital stress, technology intrusion and information overload are important conditions, while digital coping skills and self-control show no significant effects.

Keywords: digital stress; social media; influencing factors; qualitative comparative analysis; information behavior

1. Introduction

With the development of the Internet and popularization of smart devices, the global social media user base continues to expand. According to the 50th China Internet Network Development Statistics Report, by June 2022, China' s Internet penetration rate reached 74.4%, with 1.051 billion netizens, of which instant messaging users reached 1.027 billion, accounting for 97.7% of all netizens. Social media has become an integral part of daily life, providing convenience for users' work and life. However, prolonged exposure to digital environments and use of social media software also brings negative effects, particularly regarding usage behavior and emotional states. Research confirms that excessive use of information communication technology in work contexts leads to information overload and user stress. Digital stress, defined as pressure resulting from social media use, has been proposed but lacks clear and unified conceptualization. Most existing research focuses on identifying causes and consequences of technostress in work contexts, with relatively few studies examining digital stress in the Chinese context. How digital stress emerges and which factors influence its formation process remain unclear. Understanding users' digital stress levels and their formation mechanisms is crucial for people' s physical and mental health and digital literacy development. This study focuses on digital stress caused by social media use, identifying influencing factors and formation mechanisms to provide reference for alleviating digital stress among Chinese social media users and improving digital well-being.

1.1 Related Research on Social Media Use Pressure Social media is a virtual space developed based on the Internet that carries user opinions, perspectives, and interpersonal communication, representing a content production and exchange platform based on user relationships. Mainstream platforms include short video apps like TikTok and Kuaishou, social websites like Bilibili, and instant messaging tools like WeChat. Research on social media use pressure focuses on three aspects: First, different user groups, such as college students' loneliness and social media use, where fear of missing out acts as a mediator, or enterprise employees who experience higher workplace communication load with increased social media use. Second, comparative studies across platforms, exploring differentiated behaviors and their causes. Third, information behaviors during social media use, including search behavior, negative usage, and ignoring/blocking behaviors. Most existing studies treat social media use as the endpoint, exploring motivations and influencing factors while paying less attention to the psychological impacts and user experiences during and after use. This study focuses on the digital stress caused by social media use.

1.2 Related Research on Digital Stress Rooted in psychology, stress comprises stressors and stress responses. Digital stress emerges when individuals' capabilities and resources are insufficient to cope with events. Hefner defines digital stress as pressure from permanent and extensive ICT use, representing subjective reactions to stressors. Fasoli defines it as pressure when users find digital technology' s information and communication stimuli difficult to manage. Steele conceptualizes digital stress as exposure to stressors on smart devices, categorizing it into four components: fear of missing out and connection overload. This study defines digital stress as painful subjective experiences caused by internal and external factors during social media use.

Existing research attributes digital stress causes to information environment, social environment, and personal factors. Information overload and technostress lead to digital stress. Communication load from Internet multitasking positively correlates with digital stress. Social environment factors like organizational support affect digital stress, as do demographic characteristics and personality traits. Most studies focus on work or private life contexts separately, with less attention to specific contexts. Methodologically, most use linear regression to examine single variables' impacts, ignoring interdependencies and interactions among factors. This study employs qualitative comparative analysis to explore influencing factors and formation paths from a configuration perspective.

2. Research Design

This study adopts a mixed-method approach combining grounded theory and qualitative comparative analysis.

2.1 Interview Procedures We conducted semi-structured interviews with social media users to identify factors causing digital stress. Interviewees were

selected based on education level and gender to ensure coverage of different regions, ages, and education backgrounds. Using a combination of voice calls and offline interviews, we conducted 21 one-on-one interviews lasting approximately 40 minutes each. All interviews were recorded and transcribed verbatim following non-processing principles.

2.2 Interview Data Collection Based on existing research and social media usage characteristics, we developed an interview outline (Table 1) and conducted semi-structured interviews. After introducing the purpose and background and explaining the concept of digital stress, we entered the main interview phase, targeting regular social media users.

2.3 Data Coding We employed grounded theory to code interview data. After thoroughly familiarizing ourselves with the transcripts, we followed open coding, axial coding, and selective coding processes. In open coding, we segmented the data and extracted initial concepts such as "too many software platforms" and "blurred scene boundaries," forming 21 initial concepts and 10 basic categories including technology intrusion. In axial coding, we further categorized these into five main categories: technological factors, social factors, environmental factors, and personal factors (Table 2). In selective coding, we identified typical relationships (Table 3) and constructed a theoretical model (Table 4).

2.4 Model Construction Through coding of semi-structured interview data, we summarized nine influencing factors from four dimensions: technology, social, environment, and personal characteristics. The four-dimensional classification satisfies the logical relationship of external stressors → personal response → environmental factors, aligning with stress generation processes. The configuration model is shown in Figure 1.

2.5 Theoretical Saturation and Reliability/Validity Tests After coding 19 interview transcripts, no new concepts or relationships could be extracted. Continuing coding of the remaining two transcripts yielded no additional concepts, indicating theoretical saturation. Two researchers conducted the coding, achieving Holsti' s reliability coefficient of 0.85, meeting consistency requirements. For validity, we performed cross-checks to ensure coding result validity.

3. Configuration Analysis

3.1 Questionnaire Design and Collection

3.1.1 Questionnaire Design Based on the theoretical model, we designed a questionnaire using established scales from Chinese and English literature. The questionnaire comprised three parts: (1) concepts and instructions; (2) basic respondent information and commonly used social media platforms; (3)

measurement scales for digital stress influencing factors using seven-point Likert scales. We pre-tested the initial scale with three experts and ten users, refining wording based on feedback. Specific measurement items and sources are shown in Table 5.

3.1.2 Questionnaire Collection Targeting social media users, we distributed 290 questionnaires through social networks and online platforms (WeChat, QQ, Baidu Tieba), covering Hubei, Henan, and other provinces. After excluding 28 invalid responses (short completion time or identical answers), we obtained 262 valid questionnaires. Sample descriptive statistics are shown in Table 6.

3.2 Reliability and Validity Tests All variables' Cronbach' s α coefficients exceeded 0.8, and composite reliability (CR) values exceeded 0.8, indicating good reliability. Factor loadings for all measurement items were above 0.7, and average variance extracted (AVE) values exceeded 0.5, demonstrating good convergent validity. The square root of each variable' s AVE was greater than its correlations with other variables, showing good discriminant validity.

3.3 Data Calibration Following Liu et al.' s method, we calibrated scale values as: 1$\rightarrow$0.1, 2$\rightarrow$0.2, 3$\rightarrow$0.3, 4$\rightarrow$0.4, 5$\rightarrow$0.6, 6$\rightarrow$\$0.8. Since fsQCA cannot handle membership degrees of exactly 0.5, we converted 0.5 to 0.501 following Fiss' s recommendation.

3.4 Necessary Condition Analysis We used fsQCA software for single-factor necessary condition analysis, with other variables as antecedents and digital stress as the outcome. Results (Table 7) show all variables' consistency below 0.9, indicating no single necessary condition. Four variables (overuse, fear of missing out, technology intrusion, information overload) had consistency between 0.8-0.9, suggesting near-necessary conditions. This indicates single conditions cannot significantly cause digital stress, requiring configuration analysis.

3.5 Configuration Effect Analysis With nine antecedent conditions producing 512 possible combinations, we set case frequency threshold at 3 (retaining 75% of cases) and consistency threshold at 0.8. After generating the truth table, PRI consistency was set at 0.75. The standardized analysis yielded six pathways to high digital stress (Table 8).

All six configurations share overuse and fear of missing out as core conditions, indicating these are key factors. Technology intrusion and information overload are important conditions. Digital coping skills and self-control show no significant effects. We categorized the six paths into three driver patterns based on core conditions:

Technology-Social-Environment Type (Configurations 1, 2, 3): Social and environmental factors dominate. When users experience technology intrusion,

information overload, fear of missing out, and approval anxiety under high social expectations, they develop high digital stress even with coping skills and self-control.

Technology-Social-Personal Type (Configurations 4, 5): Technology, social, and personal factors jointly determine digital stress. Configuration 4 notably lacks information overload, suggesting other factors can cause stress even without it.

Technology-Social Type (Configuration 6): Technology and social factors alone can cause high digital stress when organizational/social expectations are absent, showing multiple equifinal causal combinations.

3.6 Robustness Test We tested robustness by adjusting consistency threshold to 0.75 and case frequency threshold to 2. Both adjustments produced the same six configurations with consistent overall coverage (0.678618) and consistency (0.921973), confirming result stability.

4. Conclusions and Implications

4.1 Research Conclusions First, we identified nine influencing factors across four dimensions: technology (overuse, technology intrusion, information overload), social (communication load, fear of missing out, approval anxiety), environment (social expectation), and personal characteristics (digital coping skills, self-control). Second, six formation pathways exist, with overuse and fear of missing out as key factors. Technology intrusion and information overload are important conditions, while personal factors show limited effects. Third, social expectation significantly impacts digital stress, appearing in four pathways.

4.2 Practical Implications Users should scientifically manage social media platforms, improve coping skills, and filter low-quality information. Platforms should optimize information display, implement anti-addiction modes, and provide content management tools to limit overuse and prevent information overload. Organizations should foster supportive information environments and community atmospheres to help reduce digital stress.

4.3 Limitations and Future Directions This study focuses on factors causing digital stress rather than user behaviors. Future research should incorporate social media usage behaviors to explore the complete mechanism from influencing factors through digital stress to user behavior. Additionally, samples were primarily young users; future studies should expand age ranges to improve generalizability.

References

[1] China Internet Network Information Center. The 50th China Statistical Report on Internet Development[EB/OL]. [2023-05-11]. https://www.cnnic.net.cn/n4/2022/0914/c88-

10226.html. [2] RAGU-NATHAN T S, TARAFDAR M, RAGU-NATHAN B S, et al. The consequences of technostress for end users in organizations: Conceptual development and empirical validation[J]. Information systems research, 2008, 19(4): 417-433. [3] REINECKE L, HARTMANN T, EDEN A. The guilty couch potato: The role of ego depletion in reducing recovery through media use[J]. Journal of communication, 2014, 64(4): 569-589. [4] NITSCH C, KINNEBROCK S. Well-known phenomenon, new setting: Digital stress in times of the COVID-19 pandemic[J]. Studies in communication and media, 2021, 10(4): 533-556. [5] WANG J S, YANG C, BAO Y J. Research on the impact of technostress on the life well-being of doctors[J]. Chinese primary health care, 2021, 35(1): 81-84. [6] WEINSTEIN E C, SELMAN R L. Digital stress: Adolescents' personal accounts[J]. New media & society, 2016, 18(3): 391-409. [7] WEINSTEIN E C, SELMAN R L, THOMAS S, et al. How to cope with digital stress[J]. Journal of adolescent research, 2016, 31(4): 523-540. [8] STEELE R G, HALL J A, CHRISTOFFERSON J L. Conceptualizing digital stress in adolescents and young adults: Toward the development of an empirically based model[J]. Clinical child and family psychology review, 2020, 23(1): 15-26. [9] KAPLAN A M, HAENLEIN M. Users of the world, unite! The challenges and opportunities of social media[J]. Business horizons, 2010, 53(1): 59-68. [10] PI L Y, LI X. Research on the relationship between loneliness and problematic mobile social media usage: Evidence from variable-oriented and person-oriented analyses[J]. China journal of health psychology, 2023, 31(6): 936-942. [11] DING W L, LING H, WANG R. Research on the influence of enterprise social media use on employees' job prosperity—Based on the dual mediating role of workplace communication pressure and social capital[J]. New media research, 2023, 9(17): 1-6, 13. [12] LIU Y. A study on the differentiation of WeChat and Weibo use from the perspective of Goffman' s drama theory[J]. Journalism communication, 2020(21): 63-64. [13] LEMAN H. Social media in healthcare: Connect, communicate, collaborate[J]. J med libr assoc, 2012, 100(2): 148-149. [14] LIANG S B, CHEN Y Y, REN Y Y. Mobile search behavior of social media app users: Context, strategy and path[J]. Documentation, information & knowledge, 2022, 39(6): 133-142. [15] WANG W C, ZHANG B H. Review on social media users' fatigue and negative behaviors[J]. Information research, 2020(3): 103-110. [16] LIU K S. Application and trails of mental stress[J]. Journal of Hengyang normal university, 2003, 24(1): 102-106. [17] COHEN S, JANICKI-DEVERTS D. Who' s stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006, and 2009[J]. Journal of applied social psychology, 2012, 42(6): 1320-1334. [18] HEFNER D, VORDERER P. Digital stress: Permanent connectedness and multitasking[M]. London: Routledge, 2016: 237-249. [19] FASOLI M. The overuse of digital technologies: Human weaknesses, design strategies and ethical concerns[J]. Philosophy & technology, 2021, 34(4): 1409-1427. [20] THOMPSON D V, HAMILTON R W, RUST R T. Feature fatigue: When product capabilities become too much of a good thing[J]. Journal of marketing research, 2005, 42(4): 431-442. [21] REINECKE L, AUFENANGER S, BEUTEL M E, et al. Digital stress over the life span:

The effects of communication load and Internet multitasking on perceived stress and psychological health impairments in a German probability sample[J]. Media psychology, 2017, 20(1): 90-115. [22] BÜCHI M, FESTIC N, LATZER M. Digital overuse and subjective well-being in a digitized society[J]. Social media and society, 2019, 5(4): 205630511988603. [23] HAMPTON K N, LU W X, SHIN I. Digital media and stress: The cost of caring 2.0[J]. Information, communication & society, 2016, 19(9): 1267-1286. [24] GUI M, BÜCHI M. From use to overuse: Digital inequality in the age of communication abundance[J]. Social science computer review, 2021, 39(1): 3-19. [25] COSTA JR P T, MCCRAE R R. The revised neo personality inventory (neo-pi-r)[M]. California: Sage Publications, Inc, 2008. [26] VON ERWERBSTATIGEN B. Digitaler stress in Deutschland[J]. Standort, 2018, 42: 260-262. [27] TARAFDAR M, TU Q, RAGU-NATHAN T. Impact of technostress on end-user satisfaction and performance[J]. Journal of management information systems, 2010-11, 27(3): 303-334. [28] REINECKE L. POPC and well-being[M]//VORDERER P, HEFNER D, REINECKE L, et al, eds. Permanently Online, Permanently Connected. New York and London: Routledge, Taylor & Francis Group, 2017: 233-243. [29] HEATH H, COWLEY S. Developing a grounded theory approach: A comparison of Glaser and Strauss[J]. International journal of nursing studies, 2004, 41(2): 141-150. [30] ABDULLOH M A H. Gambaran fear of missing out (FOMO) pada mahasiswa pekanbaru[D]. Republic of Indonesia: Universitas Islam Riau, 2021. [31] ZHANG S W, ZHAO L, LU Y B, et al. Do you get tired of socializing? An empirical explanation of discontinuous usage behaviour in social network services[J]. Information and management, 2016, 53(7): 904-914. [32] LAUMER S, MAIER C. Social media stress: A literature review and future research directions[M]//LEE Z W Y, CHAN T K H, CHEUNG C M K, eds. Information technology in organisations and societies: Multidisciplinary perspectives from AI to technostress. Bristol: Emerald Publishing Limited, 2021: 203-242. [33] SONG X K, ZHAO Y X, ZHANG X H. Developing a fear of missing out (FoMO) measurement scale in the mobile social media environment[J]. Library and information service, 2017, 61(11): 96-105. [34] ZHANG Q F. Scale development for social media fatigue[D]. Xiamen: Xiamen University, 2017. [35] TANGNEY J P, BAUMEISTER R F, BOONE A L. High self-control predicts good adjustment, less pathology, better grades, and interpersonal success[J]. Journal of personality, 2004, 72(2): 271-324. [36] TAN S H, GUO Y Y. Revision of self-control scale for Chinese college students[J]. Chinese journal of clinical psychology, 2008, 16(5): 468-470. [37] FORNELL C, LARCKER D F. Evaluating structural equation models with unobservable variables and measurement error[J]. Journal of marketing research, 1981, 18(1): 39. [38] LIU Y, MEZEI J, KOSTAKOS V, et al. Applying configurational analysis to IS behavioural research: A methodological alternative for modelling combinatorial complexities[J]. Information systems journal, 2017, 27(1): 59-89. [39] RAGIN C C. Redesigning social inquiry: Fuzzy sets and beyond[J]. Social forces, 2009, 88(4): 1936-1938. [40] FISS P C. Building better causal theories: A fuzzy set approach to typologies in organization research[J]. Academy of management journal, 2011, 54(2): 393-420.