Development and Application of a Mobile Social Media FOMO Scale for College Students: Post-print

Authors: Ye Fengyun, Li Junjun

Date: 2023-07-26T00:00:00+00:00

Abstract

[Purpose/Significance] To effectively measure the level of Fear of Missing Out (FoMO) on mobile social media among college student users and provide a foundational basis for FoMO-related research, a robust and practical FoMO measurement scale was designed. [Method/Process] Original data were collected through in-depth interviews with college students. A preliminary FoMO scale was developed based on coding and extracting key FoMO characteristics using grounded theory. The preliminary scale was administered to college students to obtain sample data, which was then subjected to reliability and validity testing to optimize the scale into a formal version. Cluster analysis was employed to determine FoMO level categories, and discriminant analysis was conducted based on actual measurement data to identify the FoMO level of specific users. [Results/Conclusion] A formal FoMO scale comprising 30 items across four dimensions—situational characteristics, behavioral characteristics, outcome characteristics, and psychological characteristics—was developed. Relatively stable categories of FoMO levels were established. Actual FoMO level measurements were conducted on a sample of 105 college students drawn from three universities.

Full Text

Preamble

Vol. 63, No. 5, March 2019
ChinaXiv Cooperative Journal

Development and Application of a Measurement Scale for College Students' Mobile Social Media Fear of Missing Out (FoMO)

Ye Fengyun[1], Li Junjun[2]
[1]School of Management, Anhui University, Hefei 230601
[2]School of Management, Hangzhou Dianzi University, Hangzhou 310018

Abstract

[**Purpose/Significance**] To effectively measure the degree of Fear of Missing Out (FoMO) among college student users of mobile social media and provide a foundation for related FoMO research, this study develops a robust and practical FoMO measurement scale. [**Method/Process**] Through in-depth interviews with college students, original data were collected and a preliminary FoMO scale was developed based on key characteristics extracted via grounded theory coding. The preliminary scale was then administered to college students to obtain sample data, and reliability and validity tests were conducted to optimize it into a formal scale. Cluster analysis was used to determine FoMO degree categories, and discriminant analysis based on measured data was employed to identify the FoMO level of specific users. [**Result/Conclusion**] A formal FoMO scale comprising 30 items across four dimensions—situational features, behavioral characteristics, outcome features, and psychological characteristics—was developed. Relatively stable FoMO degree categories were established, and the scale was administered to 105 college students from three universities.

Keywords: mobile social media; college students; Fear of Missing Out (FoMO); measurement scale; development and application
Classification Number: G209
DOI: 10.13266/j.issn.0252-3116.2019.05.013

1. Research Background and Approach

The 41st Statistical Report on China's Internet Development released by CNNIC shows that as of December 2017, China's mobile internet user base reached 753 million, with utilization rates of social media platforms such as WeChat Moments, QQ Space, and Weibo reaching 87.3%, 64.4%, and 40.9% respectively, indicating that China has fully entered the mobile social era. In the mobile social media environment, individuals often habitually check their devices repeatedly to continuously monitor others and society, maintaining psychological connections with their social circles. This behavior intensifies and catalyzes information compulsion and anxiety about missing out, transforming users' fears from insufficient information to missing out on even more information—a phenomenon known as Fear of Missing Out (FoMO).

In 2013, cognitive psychologist A.K. Przybylski and colleagues first explored FoMO in the context of social media, defining it as "a pervasive apprehension that others might be having rewarding experiences from which one is absent," primarily manifested as a desire to continuously know what others are doing [1]. In 2017, Zhao Yuxiang and colleagues reviewed existing literature on FoMO concept definition, measurement scales, and influencing factors in mobile social

media environments [2]. Building on these conceptualizations and related research, we conceptualize FoMO as comprising both anxious emotions and the series of information behaviors and psychological characteristics triggered by such anxiety. Specifically, mobile social media users' FoMO is defined as: in the mobile internet environment, people's habit of using various mobile social media platforms to maintain instant connections with others or the external world; when such instant connections cannot be satisfied, individuals experience varying degrees of anxiety at the subconscious or psychological level; to alleviate this anxiety, people engage in various behaviors using mobile social media, which produce behavioral outcomes and psychological impacts.

As anxiety levels gradually intensify, mobile social media users may develop from mild to severe anxiety, with FoMO potentially evolving into addiction. However, compared to addiction, FoMO represents an earlier stage of dependency and is more amenable to early intervention and regulation through environmental modifications. Accurately measuring users' FoMO levels is fundamental to such interventions. Therefore, developing FoMO measurement scales has become an important research topic, with several scholars exploring this area. Przybylski et al. constructed a 10-item FoMO scale using principal component analysis and latent trait theory [3]. Hato developed the C-FoMO scale based on Przybylski's work to measure phone-checking frequency due to FoMO across five contexts: general situations, social activities, family/friend emergencies, important news, and work/school issues [4]. Alt created a FoMO scale comprising social FoMO (6 items), news information FoMO (3 items), and commercial information FoMO (4 items) [5]. Abel et al. developed a 10-item psychological FoMO scale through factor analysis of questionnaire samples [6]. Song Xiaokang and colleagues used expert consultation and factor analysis to construct a mobile social media FoMO scale with 16 indicators across four dimensions: psychological motivation, cognitive motivation, behavioral manifestation, and emotional dependence [7].

A careful analysis of existing FoMO scales reveals several characteristics: First, Przybylski's scale, due to its simplicity and ease of use, has been widely applied and tested in social media empirical research, generating significant academic impact. However, it was designed for traditional social media users and its applicability in mobile social media environments requires verification. Second, dependency and anxiety levels are typically used as criteria to distinguish FoMO from addiction. The definition of mobile phone dependence emphasizes both excessive use and its consequences [8], and practical mobile phone dependence scales in psychology often assess severity from these perspectives [9, 10]. In contrast, existing FoMO scales, represented by Przybylski's, are overly simplistic and direct, failing to comprehensively consider situational features, behavioral characteristics, and their resulting behavioral outcomes and psychological impacts that directly reflect FoMO severity. Moreover, they do not address how to differentiate users' FoMO levels using these indicators. Consequently, existing FoMO scales are unsuitable for practically measuring mobile social media users' FoMO levels.

College students represent a typical user group of mobile social media. This study aims to develop a mobile social media FoMO measurement scale specifically for college students and apply it to measure and analyze their FoMO levels. To achieve this objective, our research approach is: (1) collect original data through in-depth user interviews, extract fundamental FoMO features using grounded theory coding, and develop a preliminary mobile social media FoMO scale; (2) administer the preliminary scale to users to obtain sample data, optimize it through reliability and validity testing to form a formal scale; (3) conduct cluster analysis based on the formal FoMO scale to determine FoMO degree categories, then perform discriminant analysis on measured data to identify specific users' FoMO levels.

2. Development of the Preliminary Scale

2.1 In-Depth Interviews

In-depth interviews have long been a useful data collection method for various qualitative studies [11], essentially eliciting participants' interpretations of their experiences [12] to explore specific issues in depth. Based on relevant literature and research objectives, we designed a semi-structured interview guide using the STAR method for critical incident analysis, covering four feature dimensions: situation, behavior, outcome, and psychology. Specific questions are shown in Table 1 .

During interviews, interviewers could flexibly adjust question order based on actual circumstances, encouraging participants to actively recall, reflect, explain, and describe details. We invited 30 college students who frequently used mobile social media as participants, scheduling appointments in advance to ensure adequate time for in-depth communication. Interview methods included face-to-face (18 participants), telephone (5 participants), and WeChat voice interviews (7 participants). Formal interviews were conducted from March 10 to April 10, 2018, with each lasting approximately 30 minutes. With participants' consent, interviewers recorded field notes and made full audio recordings.

After interviews, participants were numbered sequentially with Arabic numerals (1-30). Audio recordings were manually transcribed verbatim into Word documents using participants' numbers as filenames (1-30). Following initial coding and analysis, key incidents related to the research topic were extracted, and follow-up interviews were conducted with participants about these incidents, averaging 2.5 interviews per participant. Follow-up information was integrated into participants' original transcripts.

2.2 Grounded Theory Coding and Feature Extraction

Using NVivo 11 software, we coded the interview data. The coding results for key features across four dimensions—situation, behavior, outcome, and psychology—are shown in Tables 2 through 5 . (Note: Numbers 1-30 represent

participant IDs; frequency counts indicate occurrences of free nodes under each primary tree node.)

2.3 Preliminary Scale Construction

Based on the extracted key features of college students' mobile social media FoMO across situational, behavioral, outcome, and psychological dimensions, and integrating existing FoMO research and mobile phone dependence scales, we developed a preliminary measurement scale comprising 37 indicators across these four feature dimensions.

2.3.1 Preliminary Situational Feature Scale Mobile social media usage situations directly reflect users' ability to control FoMO. Based on four key situational features—usage state, timing, frequency, and duration—we developed 10 situational measurement items, as shown in Table 6 .

2.3.2 Preliminary Behavioral Feature Scale Specific mobile social media behaviors include entertainment, social interaction, and information consumption, directly reflecting what users fear missing. Different behaviors manifest different situational features and psychological states, indirectly reflecting FoMO severity. Based on key behavioral features across these three aspects, we developed 9 behavioral measurement items, as shown in Table 7 .

2.3.3 Preliminary Outcome Feature Scale Outcome features reflect both positive and negative impacts of mobile social media FoMO on users, with impact severity directly indicating FoMO seriousness and users' attitudes toward mobile social media. Based on outcome features extracted from both positive and negative perspectives, we developed 10 outcome measurement items, as shown in Table 8 .

2.3.4 Preliminary Psychological Feature Scale Coding revealed that users exhibit completely different psychological characteristics before and after using mobile social media, indicating that FoMO psychological features are not simply anxiety. Unlike previous FoMO scales that only examined anxiety, we developed 8 psychological measurement items based on key psychological features before and after usage, as shown in Table 9 .

3. Preliminary Scale Testing and Optimization

3.1 Scale Administration and Sample

The administered scale based on the preliminary measurement scale consisted of two parts: (1) basic personal information (all single-choice questions); (2) the main scale using a 5-point Likert scale (5 = "very consistent," 4 = "relatively consistent," 3 = "neutral," 2 = "relatively inconsistent," 1 = "very inconsistent"), asking respondents to rate their actual situations.

To ensure sample quality and data authenticity, paper questionnaires were administered from April 15 to May 5, 2018, to college students at six universities in Hefei, Nanjing, and Hangzhou. A total of 900 questionnaires were distributed, yielding 824 valid responses (387 male, 437 female), aged 17-24. School and grade distributions are shown in Table 10 .

3.2 Reliability Testing

Reliability refers to the consistency, stability, and reliability of measurement results, with higher coefficients indicating greater consistency. Cronbach's α coefficient is commonly used, with values above 0.7 considered acceptable [13]. Items with corrected item-total correlation (CITC) below 0.4 and Cronbach's Alpha if Item Deleted (CAID) above the dimension's overall α should be removed [14, 15].

Using SPSS 18.0, the overall Cronbach's α for 37 items was 0.923, indicating excellent reliability. Dimension-specific reliability data are shown in Table 11 . Items B1 and R4 met deletion criteria (low correlation and improved dimension reliability after deletion) and were removed. The remaining 35 items proceeded to validity testing.

3.3 Validity Testing

3.3.1 Exploratory Factor Analysis (EFA) EFA requires separate data sources from CFA [16]. We randomly split the sample: 410 responses for EFA (Sample 1) and 414 for CFA (Sample 2).

Before EFA, KMO (Kaiser-Meyer-Olkin) test assessed factor analysis suitability. Kaiser suggests that higher KMO values indicate more common factors and greater suitability; KMO < 0.5 is unsuitable. Using SPSS 18.0, Sample 1 yielded KMO $= 0.894$ (>0.5) and Bartlett's test $^2 = 6750.441$ ($p < 0.001$), indicating sufficient inter-item correlation for factor analysis. Principal component analysis with varimax rotation and Kaiser normalization was used, converging after 7 iterations. The rotated component matrix is shown in Table 12 .

Items S10, B3, and B8 were cross-loading items with poor discriminant validity and were removed. The remaining 32 items formed a four-dimensional model, with factor loadings shown in Table 13 .

3.3.2 Confirmatory Factor Analysis (CFA) Using AMOS 17.0 with Sample 2, we conducted CFA on the four-dimensional model from Table 13. Maximum likelihood estimation yielded standardized regression coefficients (factor loadings) shown in Table 14 . Factor loadings between 0.50 and 0.95 indicate good model fit, with higher values reflecting better representation of the latent dimension [17]. Items B2 and R1 had loadings <0.50 and were removed.

The four-dimensional model was re-analyzed after removing B2 and R1. Model fit indices are shown in Table 15 , indicating excellent fit. All 30 remaining

items had factor loadings exceeding the minimum threshold.

3.4 Retest Reliability and Formal Scale Formation

After multiple adjustments, the revised scale required reliability retesting. Using the full sample, the 30-item scale achieved overall Cronbach's $\alpha = 0.917$, with dimension coefficients of 0.869 (situational), 0.755 (behavioral), 0.770 (outcome), and 0.845 (psychological). All CITC values exceeded 0.4, confirming good retest reliability. The revised scale was adopted as the formal measurement scale, with items listed in Table 16 .

4. Application of the Measurement Scale

4.1 Classification of User FoMO Levels

After developing the formal scale, we established FoMO degree categories. Following conventional practice and principles of simplicity and practicality, we specified three categories. Using SPSS 18.0, K-Means Cluster Analysis based on the formal scale classified college students' mobile social media FoMO into stable "high," "medium," and "low" categories. Combined with ANOVA results, 3 = high FoMO, 2 = medium FoMO, and 1 = low FoMO. Cluster analysis results are shown in Table 17 .

Among 824 valid responses, 409 students had high FoMO, 250 had medium FoMO, and 165 had low FoMO. These results provide the basis for subsequent discriminant analysis.

4.2 Scale Application and Discriminant Analysis

In May 2018, we randomly selected 35 sophomores majoring in Information Management and Information Systems from each of three universities (Anhui University, Nanjing Agricultural University, and Hangzhou Dianzi University) for field testing. Discriminant analysis in SPSS 18.0 (Analyze → Classify → Discriminant) was used to determine individual students' FoMO levels, with results shown in Table 18 .

Results showed high FoMO among 21 Anhui University students, 18 Nanjing Agricultural University students, and 14 Hangzhou Dianzi University students; low FoMO among 7, 14, and 11 students respectively. The three universities showed distinct FoMO distributions, with Anhui University having the most high-FoMO students and Hangzhou Dianzi University showing the most balanced distribution. This demonstrates the scale's discriminant validity and the stability of the FoMO categories. Future research can compare different universities, grades, or majors using larger samples.

5. Conclusions and Future Directions

Existing FoMO scales were primarily developed for research purposes, lacking focus on specific user groups and featuring relatively obscure items. Different age groups exhibit different FoMO characteristics, making existing scales unsuitable for direct measurement of specific users' FoMO levels. Through in-depth interviews with college students and rigorous reliability and validity testing, we developed a mobile social media FoMO measurement scale comprising situational, behavioral, outcome, and psychological dimensions, addressing the limitation that existing scales are unsuitable for practical measurement. Innovatively, we established relatively stable categories through cluster analysis and identified individual users' FoMO levels via discriminant analysis.

The developed scale and methodology have several specific applications: (1) As a practical tool for measuring college students' mobile social media FoMO, enabling analysis of actual conditions and prevention of progression to addiction. (2) With extensive measurement data, future research can use ANOVA to examine differences across universities, regions, grades, personalities, and GPA levels, and conduct longitudinal studies to analyze developmental patterns. (3) Provide methodological references for developing FoMO or addiction scales for different age groups. (4) Establish measurement indicators for FoMO variables in studies examining FoMO mechanisms or influencing factors.

References

[1] PRZYBYLSKI AK, KOU M, DEHAAN CR, et al. Motivational, emotional, and behavioral correlates of fear of missing out[J]. Computers in human behavior, 2013, 29(4): 1841-1848.
[2] Zhao Yuxiang, Zhang Xuanhui, Song Xiaokang. Research review and prospect of user Fear of Missing Out (FoMO) in mobile social media environments[J]. Library and Information Service, 2017, 61(8): 133-144.
[3] PRZYBYLSKI AK, KOU M, DEHAAN CR, et al. Motivational, emotional, and behavioral correlates of fear of missing out[J]. Computers in human behavior, 2013, 29(4): 1841-1848.
[4] HATO B. Mobile phone checking behavior out of a fear of missing out: development, psychometric properties and test-retest reliability of a C-FoMO-Scale[D]. Tilburg: Tilburg University, 2013: 21-45.
[5] ALT D. College students' academic motivation, media engagement and fear of missing out[J]. Computers in human behavior, 2015, 49(8): 111-119.
[6] ABEL JP, BUFF CL, BURR SA. Social media and the fear of missing out: scale development and assessment[J]. Journal of business & economics research (online), 2016, 14(1): 33-44.
[7] Song Xiaokang, Zhao Yuxiang, Zhang Xuanhui. Research on the construction of a FoMO scale in mobile social environments[J]. Library and Information Service, 2017, 61(11): 96-105.
[8] Jia Yue. Review of foreign research on mobile phone dependence[J]. Journal of Beijing University of Posts and Telecommunications (Social Sciences

Edition), 2015, 17(3): 74-79.
[9] Jiang Yongzhi, Bai Xiaoli. Preliminary development and application of a college student mobile phone dependence scale[J]. Journal of Educational Psychology, 2013, 1(3): 181-187.
[10] Xiong Jie, Zhou Zongkui, Chen Wu, et al. Development of the mobile phone addiction tendency scale for college students[J]. Chinese Mental Health Journal, 2012, 26(3): 222-225.
[11] Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis[M]. Translated by Bian Guoying. Chongqing: Chongqing University Press, 2009: 26.
[12] SEIDMAN IE. Interviewing as qualitative research: A guide for researchers in education and the social sciences (2nd ed)[M]. New York: Teachers College Press, 1998.
[13] Ornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error[J]. Journal of marketing research, 1981, 18(1): 39-50.
[14] Shi Guohong, Yue Jiangjun, Chen Jingxian. Construction and empirical research of a library service quality measurement scale in China[J]. Journal of Library Science in China, 2010, 36(4): 37-46.
[15] Qi Xianghua. Construction of a library electronic service quality evaluation scale[J]. Information Theory and Practice, 2014, 37(11): 98-103.
[16] ANDERSON JC, GERBING DW. Structural equation modeling in practice: A review and recommended two-step approach[J]. Psychological bulletin, 1988, 103(3): 411-423.
[17] Wu Minglong. Structural equation modeling—AMOS operation and application (2nd edition)[M]. Chongqing: Chongqing University Press, 2013: 224.

Author Contributions

Ye Fengyun: Responsible for topic selection, structural design, and paper writing;
Li Junjun: Assisted with investigation, statistical analysis, and paper revision.

English Abstract

[Purpose/significance] In order to measure the degree of social media FoMO effectively and provide the preliminary basis for related research, a robust and practical FoMO measurement scale has been designed. **[Method/process]** Firstly, through in-depth interviews with college students to obtain the original data, the FoMO preliminary scale has been prepared based on the key characteristics of FoMO extracted from the grounded theory coding. Then, the initial scale has been used to obtain sample data, and optimized to form a formal scale. Finally, the FoMO degree category is determined by cluster analysis and the FoMO degree of specific users is determined based on the measured data. **[Result/conclusion]** The formal FoMO scale of 30 projects has been developed

from four dimensions: situational features, behavioral characteristics, result characteristics and psychological characteristics. A relatively stable category of FoMO level has been formed, and 105 undergraduates have been selected from three universities to measure the degree of FoMO.

Keywords: mobile social media; college student; FoMO; measurement scale; development and application

Note: Figure translations are in progress. See original paper for figures.