Postprint: Lurker Role Identification and Behavioral Motivation Analysis in WeChat Groups

Authors: Li Gang, Li Xianxin, Ba Zhichao, Du Zhitao

Date: 2023-08-27T00:00:00+00:00

Abstract

[Purpose/Significance] The information exchange process in WeChat groups encompasses diverse role types. Identifying lurker role types and analyzing the motivations for lurking behavior in WeChat groups holds significant importance for deeply investigating the information exchange process and comprehending its intrinsic communication mechanisms. [Method/Process] This study employs authentic communication samples from WeChat groups as the research object. We calculate members' direct participation degree and indirect dependency degree, and design a member outlier rate algorithm to identify lurker cohorts. Based on time-series message counts, we classify lurker role types. By defining member interaction intensity and interest congruence, we compute intimacy between members and construct an information exchange network using these as edge weights. Combining dynamic evolution characteristics of network structure, we analyze the motivations underlying lurking behavior among WeChat group members. [Results/Conclusion] Through calculating member outlier rates and time-series message counts, lurkers and their role types in WeChat groups can be effectively identified. Evolutionary analysis of members' network embedded positions and role functions reveals that member lurking behavior is primarily associated with member status, topic interest level, and relationship closeness.

Full Text

Identification of Roles and Behavioral Motivation Analysis of Lurkers in WeChat Groups

Li Gang[1], Li Xianxin[1], Ba Zhichao[1], Du Zhitao[2] [1]Center for Studies of Information Resources, Wuhan University, Wuhan 430072 [2]School of Journalism and Communication, University of Chinese Academy of Social Sciences, Beijing 100089

Abstract

[**Purpose/Significance**] The information exchange process in WeChat groups involves diverse role types. Identifying the role types of WeChat group lurkers and analyzing the motivations behind their lurking behavior is significant for deeply exploring the information exchange process and grasping its internal communication mechanisms. [**Method/Process**] This study uses real dialogue samples from WeChat groups as research objects, calculates members' direct participation and indirect dependency, and designs a member outlier rate algorithm to identify lurker groups in WeChat groups. Based on time-series message counts, lurker role types are classified. By defining member interaction intensity and interest congruence to calculate intimacy between members, which serves as edge weights, an information exchange network is constructed. Combined with dynamic evolution characteristics of network structure, the behavioral motivations of WeChat group members' lurking behavior are analyzed. [**Result/Conclusion**] Through calculating member outlier rates and time-series message counts, lurkers and their role types in WeChat groups can be effectively identified. Based on evolutionary analysis of members' network embedding positions and role functions, it is found that lurking behavior is mainly related to member status, topic interest, and relationship closeness.

Keywords: WeChat group; lurkers; role identification; lurking behavioral motivations

---

1. Introduction

WeChat is a personalized three-dimensional communication platform centered on user relationships with strong social attributes and emotional stickiness, whose essence is information communication and exchange. Members in WeChat groups can communicate point-to-point through the @ function and engage in many-to-many exchanges around topics. The information exchange process features "infinite drifting" of topics and unlimited flow of discourse. However, similar to other social media, the information exchange process in WeChat groups also presents a trend of diversified role types and continuous evolution, with active members actively participating in group exchanges and "silent" groups "peripheral" to group chats, which scholars refer to as "lurkers." Lurkers in WeChat groups mostly "freeride" to enjoy group resources during information exchange. Their "non-participation" inevitably disrupts the balance of information exchange, reduces social capital development, and hinders the sustainable development of WeChat groups. Therefore, research on lurker roles, behaviors, and motivations can both encourage their active participation in information exchange and promote sustainable development of WeChat group information exchange, as well as facilitate the display of group wisdom and collective intelligence, contributing to group decision-making assistance and open innovation in various contexts.

Existing research mainly focuses on social networking sites (SNS), online Q&A, Wikipedia, and email discussion communities, examining lurker definition in specific contexts, role classification, behavioral pattern revelation, and motivation analysis. However, WeChat group user-generated content shows obvious discrete distribution and concentration trends, presenting more significant Pareto distribution and lurking phenomena, with more complex behavioral motivations and many new characteristics different from traditional social networks. Therefore, this study takes the WeChat group information exchange process as the research object, considering members' direct participation and indirect dependency in group chats, constructing a member outlier rate algorithm from message quantity and message days to identify WeChat group lurkers, and building a lurker role classification framework based on time-series message counts. It designs an intimacy algorithm based on member direct/indirect interaction and interest congruence to construct an information exchange network, combining network structure dynamic evolution features to comprehensively analyze and discuss members' behavioral patterns and motivations.

---

2. Related Work

2.1 Conceptual Analysis of Lurkers Foreign researchers refer to lurkers as "lurker" or "non-public participant" (NPP), meaning members in virtual communities or websites who read posts but do not post or reply. However, as a complex and special group, no unified conceptual system has been formed for lurkers yet. Early studies by scholars such as P. Kollock et al., P. Jenny et al., and G. Lashed equated lurkers with silent members, considering them user groups who never speak in communities or forums. C. Ridings et al. expanded this definition to include members who speak infrequently. With the rise and development of social media, defining lurkers simply as "silent groups" or "infrequent speakers" is no longer appropriate, and definitions should be expanded according to specific application contexts and platforms.

Zhao Yuxiang et al. and Wang Fang et al. used statistical methods to quantitatively identify lurkers in social media platforms like Flickr, YouTube, and WeChat groups, revealing long-tail phenomena and power-law distributions in information exchange processes. Scholars K. Young and L. Widyanto approached from internet addiction, cleverly using the opposite of lurking to conduct bidirectional research on internet lurking and addiction for deeper analysis. WeChat group information exchange also presents diverse member types with unbalanced user-generated content showing significant Pareto distribution and numerous peripheral lurkers. However, they are not simply "silent groups" who never speak, requiring elaboration and definition based on WeChat group characteristics. This study defines WeChat group lurkers as members who do not speak or speak rarely, and further designs algorithms for identification. This identification and analysis both supplements and extends the lurker conceptual system in diversified social media environments, and helps reveal behavioral

patterns and analyze motivations of lurkers in WeChat group information exchange.

2.2 Lurker Role Classification Research To accurately analyze the emergence and development of lurker behavioral patterns, researchers have classified lurkers from multiple perspectives. V. Soroka et al., M. Takahashi et al., and D. Nonnecke et al. further divided lurkers into four types: negative silence, positive activity, intermittent participation, and surfacing. Specifically: negative silence—equivalent to "silent members" who never create or share content; positive activity—lurkers who do not create or share content in online communities but communicate privately with creators through instant messaging tools; intermittent participation—lurkers who are sometimes active and sometimes silent in virtual communities; surfacing—lurkers who are completely silent in online communities for a period but participate in community creation or sharing after being induced by certain reasons.

Similarly, P. Sloep et al. and Zhao Yuxiang et al. believe lurkers include not only silent members with zero messages but also those who evolve from silence to speaking over time. The ambiguity in lurker definitions leads to differences in identifying internal lurker groups, which in turn causes the emergence of different lurker types. Therefore, based on existing research and WeChat group characteristics, this study classifies WeChat group lurker roles into four types: persistent silent lurkers with zero messages; intermittent lurkers who sometimes speak and sometimes remain silent; positive conversion lurkers who transition from silence to speaking over time; negative conversion lurkers who transition from speaking to silence over time. This time-series-based classification lays the foundation for revealing lurker behavioral patterns and analyzing their motivations.

2.3 Lurker Behavioral Motivation Analysis Researchers have studied lurker behavioral motivations from various perspectives. R. Nonnecke et al. summarized lurker motivations into four aspects: external constraints, identity cognition, group characteristics, and member characteristics. S. Rafaeli et al. believed lurking behavior is mainly driven by culture and social capital. I. Shklovski et al., A. Bonaccorsi et al., and Zhao Yuxiang et al. further summarized motivations into two categories: internal and external motivations, mainly involving social, economic, and technical levels. Internal motivations include social factors like time constraints and privacy concerns, economic factors like personal needs and satisfaction, and technical factors like lack of expertise and personal ability. External motivations at each level mainly include information overload and response delays, external rewards, and technical barriers. Later studies by J. Preece et al. and C. Lampe et al. further incorporated personal identity, belonging, commitment, and social loafing into internal motivations, while B. Shneiderman et al., B. Nonnecke et al., and V. Soroka et al. incorporated forum responses, information value, organizational identity, and community atmosphere into external motivations, greatly enriching the lurker motivation clas-

sification system. Other influencing factors mainly include cultural/language differences, personal characteristics, and topic awareness.

By summarizing relevant research, lurker motivation analysis can be divided into internal and external motivation analysis. However, different virtual communities and platforms have different emphases due to their differences. Therefore, based on WeChat group information exchange characteristics and dynamic evolution features of information exchange networks, this study analyzes lurker behavioral motivations from member status, member relationships, and topic interest.

---

3. WeChat Group Lurker Identification and Role Classification

This study examines lurker roles in WeChat group information exchange from two aspects: lurker group identification and role classification. First, it designs a member outlier rate algorithm based on direct participation and indirect dependency to identify lurkers in WeChat groups. Second, it uses time-series message counts to classify roles. Considering the dynamic nature of lurker behavior over time and its influence by group member relationships, it finally designs an intimacy algorithm based on direct/indirect interaction and interest congruence to construct a member relationship network, examining the evolution of lurker network embedding positions and role functions based on time series.

3.1 Lurker Identification Based on Outlier Rate In WeChat groups, member message quantity reflects participation and contribution levels, representing the most direct element of members' "self-presentation" through group chats. Message days reflect relationship maintenance, indirectly demonstrating members' dependency on group exchanges. The smaller the message quantity and fewer the message days, the more peripheral the member is to group chats, meaning a higher outlier rate. Therefore, drawing on TF-IDF algorithm's idea of calculating word importance to documents, this study uses message days and message quantity importance to WeChat group information exchange, comprehensively considering direct participation and indirect dependency to construct the member outlier rate algorithm, as shown in Formula (1):

$$Centrifugation\_Rate(i) = 1 - \frac{Speak_i / AverageSpeak}{\log(TotalDays/(InDays_i + 1)) + 1}$$

Formula (1)

Where $Speak_i$ represents member i's message quantity, $InDays_i$ represents member i's message days, $AverageSpeak$ represents the group's average message quantity, and $TotalDays$ represents the group's total message days. Quantitative identification of WeChat group lurkers is important for deeper analysis

of information exchange behaviors, exploring member relationships, and maintaining group balance.

3.2 Lurker Role Classification Member outlier rate identifies WeChat group lurkers from an overall perspective, but WeChat group information exchange is complex, involving not only "information flow" of knowledge and viewpoints but also "influence flow" of topic interest and member relationships, causing dynamic evolution of member information exchange behaviors over time. Similarly, WeChat group lurkers are not a single static group; different lurkers have different temporal states. Besides the most basic lurkers ("zero messages" silent members), other lurkers' behaviors are dynamic over time, including those who continuously "freeride" on group peripheries but occasionally "bubble up," and those whose exchange behaviors show positive evolution (from silence to speaking) or negative evolution (from speaking to silence).

Therefore, relying solely on lurker group identification cannot truly reflect lurkers' participation status or relationships with members; time factors must be incorporated to deeper reveal behavioral patterns and analyze underlying motivations. Based on lurker group identification and time-series message counts, this study further classifies roles by examining lurkers' temporal outlier states. Specifically, the WeChat group information exchange process is divided into 10 time periods to examine lurkers' speaking times. Besides persistent silent lurkers with zero messages, if a lurker's speaking state only exists in the first half, they are a negative conversion lurker; if only in the second half, a positive conversion lurker; and if intermittently in both halves, an intermittent lurker (see Figure 1 [Figure 1: see original paper]).

3.3 Lurker and Group Member Relationship Measurement WeChat group information exchange differs from point-to-point WeChat private chats, being more topic-centered many-to-many exchanges. Members are not completely independent but exist in interdependent, mutually influential sets. As a special group in WeChat groups, lurker behavior is influenced by relationships with other members. If a member has weak relationships with others, they are more likely to feel "alienated" from group chats and tend to remain persistently silent, becoming persistent silent lurkers. However, if close members exist in the group, their participation or directed information in group chats may have a "gravitational" effect on the lurker, causing them to "bubble up" or engage in stronger information exchange. Therefore, analyzing member relationships helps deeper explore lurker behaviors and motivations. Although lurkers generally remain silent in WeChat group information exchange, different lurker types have different temporal behaviors and states, with dynamic participation levels, role functions, and network positions evolving over time. Thus, examining WeChat group exchange structure changes over time based on lurker relationships and analyzing the evolution of lurker role functions and network embedding positions is important for further exploring lurker behaviors and motivations.

Considering these factors, this study designs a member intimacy algorithm based on direct/indirect interaction relationships and interest congruence to measure relationships between lurkers and group members. Member interaction reflects relationship strength from exchange intensity, representing intimacy based on quantity dimensions, while interest congruence reflects topic interest similarity from exchange content, representing deeper intimacy. Interest congruence is characterized by the ratio of jointly responded topics—the higher the ratio, the stronger the homogeneity and interest similarity, meaning higher intimacy and greater possibility of participation due to interest-congruent members' speeches. Interaction degree refers to interaction relationship closeness, requiring examination of direct and indirect interaction relationships.

Drawing on citation analysis theory's author co-citation and author coupling analysis, this study examines direct and indirect interaction relationships. Direct interaction relationship: Citation analysis considers that if author A cites author B and author B cites author A, they have a co-citation relationship. Similarly, in WeChat group information exchange, if members A and B have a response structure, they have direct exchange—a direct interaction (see Figure 2 [Figure 2: see original paper]). Indirect interaction relationship: In citation analysis, author coupling considers authors citing the same references as similar, quantifiable by shared references. Similarly, WeChat group information exchange has member coupling—members who directly exchange with the same member have behavioral similarity, reflecting indirect interaction relationships. If members B and C both have response structures with member A, then B and C have an indirect interaction relationship (see Figure 3 [Figure 3: see original paper]).

Therefore, this study comprehensively considers interest congruence and direct/indirect interaction to construct the member intimacy algorithm, as shown in Formula (2):

$$Intimacy(A,B) = [\omega \cdot DInterac(A,B) + (1-\omega) \cdot IndInterac(A,B)] \cdot \frac{Topic_{A \cap B}}{Topic_A + Topic_B}$$

Formula (2)

Where $Topic_{A \cap B}$ represents the number of topics jointly participated by members A and B, $Topic_A$ and $Topic_B$ represent topics participated by members A and B respectively, $DInterac(A,B)$ represents direct interaction intensity between A and B, characterized by direct exchange ratio, and $IndInterac(A,B)$ represents indirect interaction intensity, characterized by common exchange ratio with the same members. Quantitative analysis of relationships between lurkers and group members is important for further exploring lurker information exchange behaviors, dynamic evolution, and mining lurking motivations.

4. Experimental Analysis

4.1 Data Source and Processing To analyze WeChat group lurkers, this study selected four real WeChat groups that researchers joined or established, comprehensively considering multiple factors to maximize research reliability and validity. First, all selected groups were established before June 2016, ensuring sufficient time spans. Second, groups averaged 85 members with 6,027 total messages, ensuring sample validity. Finally, considering that members joining late have message gaps, the study selected members with roughly the same joining time to reduce experimental error. Additionally, since topic models like VSM, PLSA, and LDA are based on text feature measurement, and WeChat group information exchange is fragmented with insufficient text features, this study manually identified topics based on semantic association, incorporating interjections into the same topic if relevant or creating new topics otherwise. One WeChat group was selected for in-depth case analysis, collecting member IDs, speaking times, message content, and message types as analysis text. To protect privacy, the study strictly followed the principle of "anonymize first, then analyze."

4.2 Distribution Differences of Lurkers in Different WeChat Group Types Lurker identification and role classification were conducted on three group types—friend groups, academic groups, and work groups—with statistical results showing common overall lurker distribution but significant local differences among lurker types (see Table 1). Friend group and academic group network structures were also drawn with members as nodes, exchange relationships as edges, and intimacy as edge weights using the Fruchterman-Reingold layout algorithm (see Figures 4 [Figure 4: see original paper] and 5 [Figure 5: see original paper]).

Table 1 shows that lurkers account for approximately 50% in all three group types, indicating serious imbalance in WeChat group information exchange. Theoretically, WeChat group exchange is "decentralized" without hierarchical differences, allowing free and equal communication. However, the process is actually dominated by a few, with differential participation and contribution levels and a large "non-contributing" lurker group whose behavior negatively impacts group exchange. Therefore, classifying lurker roles and analyzing motivations is important for encouraging lurker participation.

Role distribution differs across group types: Intermittent lurkers account for 65.2% in friend groups (over half of all lurkers) but only 11.1% and 23.3% in academic and work groups respectively, indicating most friend group lurkers maintain "arms-length" relationships with group chats, periodically participating and having "developable" potential, while academic and work groups have fewer "developable" members. No persistent silent lurkers exist in friend or work groups, while academic groups have 55.5%, indicating poor overall exchange effectiveness with over half of lurkers completely 脱离 ing from the exchange process as "zero-contribution" members, hindering collective wisdom and

sustainable development. Positive and negative conversion lurkers have similar proportions under 20% in friend and academic groups, while work groups have higher proportions (46.7% positive, 30.0% negative), indicating more obvious evolution trends over time. The higher positive conversion proportion suggests overall positive evolution, warranting increased attention to negative conversion lurkers and "rewards" for positive conversion lurkers to enhance cohesion.

In WeChat groups, members can participate as subjects expressing viewpoints with spontaneity and creativity, and as objects observing their own behavior and environment with reflexivity and social consciousness. Individuals build self-concepts through interaction with others, which provides important motivation for behavior. Self-concepts include self-expectations that lead individuals to act as if these expectations have been realized. In hierarchical academic groups, member status and power significantly impact information exchange behavior—members observe their viewpoint environment before expressing opinions, speaking more easily if in advantageous positions but reserving judgment if disadvantaged. Academic group members are more likely to develop negative expectations about exchange consequences, leading to "wait-and-see" attitudes rather than active participation. Meanwhile, members' lurking behavior is constrained by relationships with other members—fear of group exclusion prevents them from expressing unique viewpoints, as maintaining group consistency is considered more important than individual expression, creating an "illusion of unanimous agreement" where silence equals consent. Therefore, hierarchical academic groups have numerous persistent silent lurkers.

In contrast, friend groups based on emotional bonds have strong emotional foundations and trust without obvious hierarchical differences. As the Pygmalion effect suggests, people's emotions and concepts are unconsciously influenced by those they like and trust. When individuals receive trust and praise, they feel socially supported, enhancing self-worth and behavioral motivation. People obtain not what they want but what they expect through behavioral interaction. In equal friend groups, members gain more trust and affirmation, filling them with positive expectations for information exchange that further positively influences participation. Therefore, friend group members have stronger motivation to participate in group chats. Work groups, 不同于情感纽带的朋友群, are more constrained by established "special rules" like mandatory meeting discussions. On one hand, members cannot completely 脱离 group exchange due to such constraints, so no persistent silent lurkers exist. On the other hand, intimacy formed by external constraints is weaker than that actively built for emotional maintenance, resulting in weaker cohesion—most members tend to remain silent except when necessary. Thus, lurking behavior is closely related to member relationships.

4.3 Behavioral Motivation Analysis of Lurkers in WeChat Groups

This study selected WeChat group QC for in-depth case analysis, constructing a weighted information exchange network with members as nodes, relationships

as edges, and intimacy as edge weights. Network structure diagrams for different periods were drawn (see Figures 6 [Figure 6: see original paper] and 7 [Figure 7: see original paper]), and parameters of different lurker types' information exchange behaviors were statistically analyzed (see Table 2) to examine behavioral evolution over time. To enhance objectivity, in-depth interviews (30-40 minutes) were conducted with specific members about their lurking motivations (see Table 3).

Lurker behaviors differ based on time series, representing the internal reason for type diversity. The same lurker type also shows dynamic behaviors due to multiple factors. Members M83, M85, and M86 are persistent silent lurkers in group QC, completely 脱离 ing from information exchange with zero individual network parameters. To explore their motivations, their behaviors in other WeChat groups were examined. Member M83 remained a persistent silent lurker in academic groups but participated more actively in friend groups with frequent interactions. Considering academic groups' natural hierarchy and friend groups' equal atmosphere, persistent silent lurking is related to status and power. Interview with M83 confirmed this—he preferred free communication in equal friend groups, while "status pressure" in hierarchical academic groups suppressed his desire to speak. Member M85 had distant real-life relationships with other group members, creating natural "alienation" and preferring to stay uninvolved, while showing strong interaction in emotionally-based groups like classmate groups. Thus, lurking behavior relates to relationship closeness. Member M86's lurking was more influenced by internal factors—his introverted personality led him to prefer browsing information, believing this satisfied his needs without active participation, behaving similarly in all groups. Therefore, lurking behavior also relates to personal characteristics.

Members M58, M62, and M63 are negative conversion lurkers, transitioning from speaking to silence over time. In their speaking periods, they occupied peripheral network positions with low centrality and betweenness. Their messages received few responses, failing to meet exchange expectations—creating expectation violation. Interviews with M62 and M63 supported this explanation: after their interaction expectations were violated, both developed 排斥性 toward the exchange process, reducing participation enthusiasm and creating "cognitive arousal." Thus, lurking behavior relates to mutual response behaviors in information exchange.

Members M44, M52, M53, and M57 are positive conversion lurkers, showing opposite transitions from silence to speaking. Member M44 had centrality of 1, interacting with only one member—M17's @ behavior triggered M44's response after long silence, indicating lurking behavior relates to specific member behaviors. Member M53 made a help-seeking statement after long silence, showing browsing alone couldn't satisfy needs. Interview confirmed he usually preferred browsing, but this "bubbling" was to obtain additional benefits when browsing was insufficient. Thus, lurking behavior relates to member needs. Member M57's participation was influenced by core members' gravity—the high-status

core member's opinions triggered unanimous resonance, showing strong "halo effect," and M57 transitioned from silence to speaking under this influence. Therefore, lurking behavior relates to core members' gravitational pull. Member M52's reason for speaking was consistent with M58's—attracted by topic interest.

Members M48, M49, and M56 are intermittent lurkers with strong behavioral dynamics, periodically participating while remaining peripheral. Member M49 spoke in three periods, with highest centrality (8.183) in period 09-10 and larger individual network size, ties, and 2-step reach, indicating a participation "peak." As a "mentor group," this period coincided with "Teachers' Day," creating strong centripetal force. In contrast, period 12-01 showed significantly reduced parameters (network size of 4), indicating lurking behavior relates to specific dates and topics. Members M56 and M48 spoke in two periods with similar patterns—higher parameters in the first period but merely "bubbling" without substantive effect, likely for presence-seeking. Interviews confirmed their "bubbling" used emojis or 附和性话语 for presence, not substantive contribution. Thus, intermittent lurkers' behaviors differ across periods due to topic interest and member relationships, leading to different network embedding positions and roles.

4.4 Comparison Between WeChat Group Lurkers and Real-World "Muted Groups" This analysis shows WeChat group exchanges have numerous lurkers with diverse roles and dynamic behaviors, representing "muted" states in exchanges. Muted group theory initially focused on female groups but expanded analogically, no longer limited to gender but generalizing to all silent groups in events. The theory suggests muted behavior stems from communication barriers due to perception modes and status differences. In today's virtual communities, network behavior norms' lag, virtuality, and anonymity make group effects like muting more obvious, with more intense discourse power competition. Virtual network environments facilitate group gathering with obvious intra-group homogenization and inter-group heterogenization, easily triggering group identity phenomena. Thus, traditional muted group theory remains somewhat applicable in virtual communities but requires enrichment and diversification.

WeChat group conversations implant real-life interpersonal communication scenes into cyberspace, essentially mapping real social networks. Similar to daily conversations, they have topics and turn-taking but differ in being mediated by human-computer interfaces. This mediation transcends geographical barriers but creates concealment and virtuality, preventing accurate acquisition of identity information and timely capture of tone and facial expressions. Therefore, lurker behaviors and motivations in WeChat groups both align with muted group theory (relating to perception and status) and differ due to virtuality, concealment, and mediation, having richer diversity. As discourse analysis theory suggests discourse represents symbolic power relationships,

lurkers have weaker social power capital, playing "ruled" roles at the bottom of discourse power hierarchies. Thus, muted group theory's core concepts remain applicable but require further enrichment. Research on lurker roles and motivations enriches existing theories and helps explore WeChat group exchanges, displaying group wisdom and promoting sustainable development.

---

5. Conclusion and Future Work

This study analyzed real WeChat group exchange data. First, it examined direct participation and indirect dependency, constructing an outlier rate algorithm using message quantity and days to identify lurkers. Based on the dynamic nature of lurking behavior, it built a time-series role classification framework dividing lurkers into persistent silent, intermittent, positive conversion, and negative conversion types. Second, it designed an intimacy algorithm based on interaction degree and interest congruence to construct information exchange networks, exploring dynamic changes in lurkers' roles, network positions, and relationship closeness over time. Findings show lurking behavior relates to member status, topic interest, and relationships. Finally, comparing WeChat lurkers with real-world muted groups revealed that traditional muted group theory has applicability but requires enrichment in virtual communities. This analysis can encourage lurker participation, promote sustainable group exchange, provide theoretical support for network society governance, and facilitate group decision-making and open innovation.

Limitations include: Sample limitation—only 1-2 groups per type and only three group types may not fully reveal motivations; Only specific members were analyzed rather than every lurker, potentially missing motivations; Motivation analysis used statistical methods with less deep content mining via semantic recognition. Future work will employ content analysis methods like semantic recognition for deeper, more comprehensive exploration of lurking motivations.

References

[1] Jiang Jianguo. WeChat Groups: Issues, Identity, and Control [J]. Exploration and Free Views, 2015(11):108-112.

[2] Roseman M, Greengerg S. Building flexible groupware through open protocols[C]//Conference on organizational computing systems. New York: ACM, 1993:279-288.

[3] Barry W, Milena G, Marilyn M. Netsurfers don't ride alone: online communities as communities[M]//Kollock P, Smith M. Communities and cyberspace. New York: Routledge, 1999.

[4] Leshad G. Posters, lurkers, and in between: a multidimensional model of

online community participation patterns[C]//Salvendy G. Proceedings of the 11th HIC international conference. Las Vegas: Lawrence Erlbaum Associates, Inc, 2005.

[5] Liu Jiang, Zhao Yuxiang, Zhu Qinghua. A review of research on lurkers and lurking motivations in internet environment[J]. Library and Information Service, 2012, 56(18):65-72.

[6] Zhao Y, Wu K, Zhu Q, et al. Exploring user's classification model for UGC and its influence factors on contribution in social media[C]//Proceedings of the 2010 international conference on e-business intelligence. Oxford: Atlantis Press, 2010.

[7] Ridings C, Gefen D, Arinze B. Psychological barriers: lurker and poster motivation and behavior in online communities[J]. Communications of the association for information systems, 2006, 18(16):329-354.

[8] Sloep P, Kester L. From lurker to active participant[M]//Learning network services for professional development. Berlin: Springer, 2009:17-25.

[9] Nonnecke B. Lurking in email-based discussion lists[D]. London: South Bank University, 2000.

[10] Wang Fang, Zhai Yujia. Social structure and evolution of WeChat groups: a case analysis based on text mining[J]. Journal of the China Society for Scientific and Technical Information, 2016, 35(6):617-629.

[11] Nonnecke B, Preece J, Andrews D. What lurkers and posters think of each other[C]//Sprague R H. Proceedings of the Hawaii international conference on system sciences. Hawaii: IEEE Computer Society, 2004:1-9.

[12] Kollock P, Smith M. Managing the virtual commons: cooperation and conflict in computer communities[M]//Herring S. Computer-mediated communication. Philadelphia: John Benjamins Publishing Company, 1996:109-128.

[13] Jenny P, Blair N, Dorine A. The top five reasons for lurking: improving community experiences for everyone[J]. Computers in human behavior, 2004, 20(2):201-223.

[14] Young K. Internet addiction: the emergence of a new clinical disorder[J]. Cyberpsychology & behavior, 1996, 1(3):237-244.

[15] Young K. Internet addiction: symptoms, evaluation, and treatment[M]//Creek L, Jackson T. Innovations in clinical practice: a source book. Sarasota: Professional Resource Press, 1999:19-31.

[16] Widyanto L, Griffiths M. Internet addiction: a critical review[J]. International journal of mental health & addiction, 2006, 4(1):31-51.

[17] Soroka V, Rafaeli S. Invisible participants: how cultural capital relates to lurking behavior[C]//Proceedings of the 15th international conference on World Wide Web. New York: ACM, 2006:163-172.

[18] Takahashi M, Fujimoto M, Yamasaki N. The active lurker: a new viewpoint for evaluating the influence of an in-house online community[J]. ACM siggroup bulletin, 2002, 23(3):29-33.

[19] Andrews D, Preece J. Non-public and public online community participation: needs, attitudes and behavior[J]. Electronic commerce research, 2006, 6(1):7-20.

[20] Rafaeli S, Ravid G, Soroka V. De-lurking in virtual communities: a social communication network approach to measuring the effects of social and cultural capital[C]//Sprague R H. Proceedings of the 37th Hawaii international conference on system sciences. Hawaii: IEEE Computer Society, 2004:1-10.

[21] Shklovski I, Kotamraju N. Online contribution practices in countries that engage in internet blocking and censorship[C]//2006, 18(4):40-64.

[22] Bonaccorsi A, Rossi C. Comparing motivations of individual programmers and firms to take part in the open source movement: from community to business[J]. Knowledge technology & policy, 2006, 1(25):123-128.

[23] Nonnecke B, Preece J, Andrews D, et al. Online lurkers tell why[C]//Gorgone J, Fedorowicz J. Proceeding of the Americas conference on information systems, AMCIS 2004. New York: DBLP, 2008:321.

[24] Lampe C, Wash R, Velasquez A, et al. Motivations to participate in online communities[C]//International conference on human factors in computing systems. Atlanta: DBLP, 2010:1927-1936.

[25] Preece J, Shneiderman B. The reader-to-leader framework: motivating technology-mediated social participation[J]. AIS transactions on human-computer interaction, 2009, 1(1):13-32.

[26] Nonnecke B, Preece J. Shedding light on lurkers in online communities[J]. Ethnographic studies in real and virtual environments: inhabited information spaces and connected communities, 1999, 1(2):123-128.

[27] Soroka V, Jacovi M, Ur S. We can see you: a study of communities' invisible people through reach out[C]//Huytsman M, Wenger E, Wulf V. Proceedings of international conference on communities and technologies. Amsterdam: Kluwer, 2003:65-79.

[28] Beaudoin M. Learning or lurking?: tracking the 'invisible' online student[J]. Internet & higher education, 2002, 5(2):147-155.

[29] Nonnecke B, Preece J. Why lurkers lurk[C]//Americas conference on information systems, AMCIS 2001. Boston: AMCIS, 2001:1-10.

[30] Lee Y, Chen F, Jiang H. Lurking as participation: a community perspective on lurkers' identity and negotiability[C]//Barab S, Hay K, Hickey D. Proceedings of the 7th international conference on learning sciences. Rhodes: International Society of the Learning Science, 2006:404-410.

Author Contributions: Li Gang: Proposed research direction and guided paper writing; Li Xianxin: Proposed research ideas, designed algorithms, and wrote paper; Ba Zhichao: Provided revision suggestions and guided paper writing; Du Zhitao: Conducted data collection and processing analysis.

The Identification of Roles and Behavioral Motivation Analysis of Lurker in WeChat Group

Li Gang[1] Li Xianxin[1] Ba Zhichao[1] Du Zhitao[2]
[1]The Center for the Studies of Information Resources, Wuhan University, Wuhan 430072 [2]School of Journalism and Communication, University of Chinese Academy of Social Sciences, Beijing 100089

Abstract: [Purpose/significance] The information exchange process in WeChat group has diversified role types, and it is of great significance to define the role types of WeChat lurkers and to analyze the causes of diving behavior to further explore the process of information exchange and grasp the inner communication mechanism of WeChat group. [Method/process] Based on real dialogue samples as study objects, the paper calculated members' direct participation and indirect dependence, and designed the algorithm of the rate of outlier to quantitatively identify lurkers in WeChat group. The lurkers' character types were divided based on time series statements, calculate intimacy between members through interaction intensity and interest fit, and build the information exchange network as the weight of the side, and the behavioral motivation of lurkers was analyzed in WeChat group based on dynamic evolution of network structure. [Result/conclusion] By calculating the rate of outlier and the number of time series statements, it can effectively define the lurkers and their role types in WeChat group. Based on the evolution analysis of member network embedding position, roles and so on, it is found that there is a correlation between lurkers' behaviors and membership status, topic interest, relationship between members and so on.

Keywords: WeChat group; lurkers; role division; behavioral motivations of lurker

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