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A Privacy Study on How Social Media Users Create Paradoxical Collective Behavioral Portraits

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Abstract

This study investigates the group characteristics of WeChat users' paradoxical privacy behaviors by constructing user portraits to fully understand the differences between user group characteristics and paradoxical privacy behaviors on social media platforms, and to provide users with personalized privacy protection and targeted services, strategy and specific instructions. This study takes WeChat users as the research object and uses the Vals2 attitude scale as a reference to construct a group image annotation system for WeChat users' paradoxical privacy behavior from the perspective of psychological preferences. By issuing questionnaires, the paradoxical privacy behavior of WeChat users was analyzed using methods such as factor analysis, cluster analysis, and discriminant analysis. Clustering users' paradoxical behaviors in privacy to obtain data and characterize different user groups. Research results show that the group image of WeChat users' paradoxical privacy behavior can be divided into three types: experience-oriented, mature and rational, and egocentric. This study proposes an ambivalent group behavior model of social media user privacy. In the future, we will modify the group portrait model and consider using it in other scenarios.

Keywords: constructing user portraits, personalized privacy protection, psychological preferences, social media

1. Introduction

In recent years, social media, represented by WeChat, has become increasingly integrated into people's lives, with the long-term use of social media and frequent occurrence of online privacy incidents, social media users are often in a state of "Worry and use", expressing concern about their privacy on the one hand, and sharing personal information on social media on the other. According to the 52nd "Statistics Report (June, 2023) on the development of the Internet in China", 37.6% of internet encountered cyber security problems while using the internet in the past six months, 23.2% Internet users encountered personal information leakage, but at the same time, the number of social media users in our country continues to grow, reaching 1,0472023 by June, 2023, which has 8.86 million more than in December 2022, accounting for 97.1 percent of all Internet users. Social media users' desire to protect their privacy is inconsistent with their actual behavior, which is called the "Privacy paradox".

As the phenomenon of privacy paradox becomes more and more common, a great deal of personal information is uploaded and shared to social media, which leads to the problem of network security. In view of the problems caused by this phenomenon, the academic circle and the industry actively explore the ways to protect personal information on the internet from the aspects of personal information protection legislation, privacy protection technology innovation, etc., however, the protection of personal data privacy also needs the active participation of social media users themselves. Therefore, in-depth analysis of social media users' privacy paradox behavior group differs guiding users to pay attention to personal privacy security, prudent decision-making personal information disclosure, and actively takes privacy protection behavior, which significant to promote the management of cyberspace information security.

User profiles have been widely used in marketing, social media and other areas of user behavior research in recent years, by modeling the group type, psychological preference and behavior habit of different users in a specific situation, the behavioral characteristics of different user groups can be described, which plays an important role in helping related fields to formulate targeted marketing and management strategies, but there is little research on the application of user portraits to social media users' privacy paradoxes. At the same time, most of the existing research on the paradoxical behavior of

privacy regards users as a kind of type, and users are heterogeneous in reality, and user classification management has become an important way to provide accurate services for users in social media, however, there is still a problem of homogeneity in the methods of using and protecting users' privacy information in social media. Therefore, this paper attempts to take the current representative social media WeChat user group as the object of study, using the Vals2 model of consumer segmentation in the field of marketing to build a portrait tagging system of users' privacy paradoxical behavior, this paper analyzes the group differentiation and characteristics of WeChat users' privacy paradoxical behaviors by using user portrait technology, in order to help social media platforms such as WeChat deeply understand the producing rules of users' privacy paradoxical behaviors, reasonable use and protection of user privacy information, guide users to carefully disclose personal information, jointly maintain network information security (C. S. Yang, 2014).

In view of the problems caused by this phenomenon, the academic circle and the industry actively explore the ways to protect personal information on the Internet from the aspects of personal information protection legislation, privacy protection technology innovation, etc., however, the protection of personal data privacy also needs the active participation of social media users themselves. Therefore, in-depth analysis of social media users' privacy paradox behavior group differences and characteristics, for accurately guiding users to pay attention to personal privacy security, prudent decision-making personal information disclosure, and actively take privacy protection behavior, it is of great significance to promote the management of cyberspace information security (Gogus, A., 2019).

User profiles have been widely used in marketing, social media and other areas of user behavior research in recent years. By modeling the group type, psychological preference and behavior habit of different users in a specific situation, the behavioral characteristics of different user groups can be described, which plays an important role in helping related fields to formulate targeted marketing and management strategies, but there is little research on the application of user portraits to social media users' privacy paradoxes. At the same time, most of the existing research on the paradoxical behavior of privacy regards users as a kind of type, and users are heterogeneous in reality, and user classification management has become an important way to provide accurate services for users in social media, however, there is still a problem of homogeneity in the methods of using and protecting users' privacy information in social media. Therefore, this paper attempts to take the current representative social media WeChat user group as the object of study, using the Vals2 model of consumer segmentation in the field of marketing to build a portrait tagging system of users' privacy paradoxical behavior, this paper analyzes the group differentiation and characteristics of wechat users' privacy paradoxical behaviors by using user portrait technology, in order to help social media platforms such as wechat deeply understand the producing rules of users' privacy paradoxical behaviors, protection of user privacy information is utilized to jointly maintain network information security (Obi, U. V., 2020).

2. Literature Review

Social media users' privacy paradoxes

The concept of “Privacy Paradox” was first put forward by foreign scholars to describe the inconsistency between the actual Privacy disclosure behavior of Internet users and their claimed concern for personal Privacy. With the popularization and development of mobile internet and social media, social media users' privacy paradoxical behavior is becoming more and more common, which has attracted wide attention of scholars at home and abroad (Miaomiao Dong, 2024). Through combing, it is found that the existing research on the privacy paradox mainly focuses on the causes of the phenomenon, influencing factors and coping strategies, and most of the users of a platform as a whole, the heterogeneity of users is not fully considered. The generation of social media users' privacy paradox behavior is a complicated decision-making process, which is influenced by many factors, it is of great significance to further understand the paradoxical behavior of social media users' privacy (Ying et al., 2023).

User portraits

User Profile is to show or present the User features in the form of tagging, and to establish User model based on tagging data to realize User classification, it plays an important role in helping enterprises to accurately understand the characteristics of different user groups and provide personalized services for users. At present, the technology of user portrait is becoming more and more mature, and scholars can use various methods and different perspectives to depict the behavior of users in a particular situation, it plays an important role in the precision policy-making and precision administration of enterprises, governments and other relevant management departments (Hargittai E, 2016). In recent years, scholars in the field of library and information at home and abroad have introduced user portrait technology into the study of user information behavior, many methods such as questionnaire survey, interview, group discussion, Lda topic mining and multi-method combination are used to collect data and build user portraits, to deepen the cognition and understanding of users' various information behaviors under different situations and put forward corresponding management strategies (Tzavela E C, 2017).

The VALS2 model

In order to better understand and meet the diverse needs of consumers in the marketing process, in 1978, based on a Survey of 1,600 households in the United States, Mitchell proposed a consumer segmentation model called the Values and Lifestyle Survey (VALS2), which divided the surveyed consumers into nine distinct groups. In the 1980s, in order to adapt to the change of people's behavior difference, media diversity, life attitude and values, the related scholars put forward VALS2 model after adding psychological factors into the model. VALS2 model classifies consumers according to their behavioral differences, demographic characteristics and psychological preferences in order to reflect the behavioral and psychological characteristics of different groups of consumers. This model has been widely used in the fields of marketing, news communication and so on. In recent years, some scholars have introduced it into the research of users' information behavior, such as Guo Shunli and so on, chen Tianyuan uses the VALS2 (Hassani N S, 2020). Attitude Scale for reference to construct the user portrait of university mobile library and puts forward the strategies that are beneficial to the service marketing of library. The application of VALS2 model in the research of precision marketing and users' information behavior provides theoretical support and practical reference for the research of social media users' privacy paradox behavior group differentiation.

By combing the existing relevant research at home and abroad, we find that most of the current research on social media users' privacy paradoxical behavior regards users as a group and seldom considers the differences among users, although some researches have been carried out especially for special groups such as young people, they lack the description and representation of the user's own behavior characteristics, research on social media users' paradoxical privacy behaviors combined with their psychological preferences is also rare (Weinberger M, 2017). As one of the largest social media platforms at present, WeChat has long occupied the position of "Social hegemon" in China. After more than ten years of development, its platform functions have become more and more powerful, it is an important platform for people to disclose and share personal information. According to Tencent's 2023 interim report, as of June 30, the combined number of active accounts on WeChat and WeChat 1.327 billion, up 2 per cent year-on-year, almost covering the entire Chinese population, different psychological preferences in the process of using will make users have different behavioral characteristics when they disclose personal information. Therefore, this paper will take WeChat users as the research object, combined with VALS2 consumer segmentation model, use user portrait technology to analyze the group differences and behavior characteristics of WeChat users' privacy paradox behaviors, in order to help wechat platform further understand user behavior, provide more accurate personalized services for users to provide reference and guidance (Tian X, 2022).

3. Research design

3.1 User Portrait Design Ideas

The construction of the behavior group portrait of WeChat users' privacy paradox follows the process of 'Building tag system → data acquisition and processing → feature tag extraction → clustering discriminant analysis → feature visualization'. First of all, according to the research goal and VALS2 Subdivision index, a group portrait tagging system was designed for WeChat users' paradoxical privacy behaviors with a questionnaire according to the TAG, then it was distributed and collected, in the design of the questionnaire, much emphasis was on mining the users' cognitive requirements, obtaining the features of the users' orientation information, extracting the feature labels after obtaining the data to form the feature label data set, finally, the user group behavior tag was visualized by using Python Wordcloud toolkit to complete user portrait construction. The specific research ideas are shown in Figure 1.

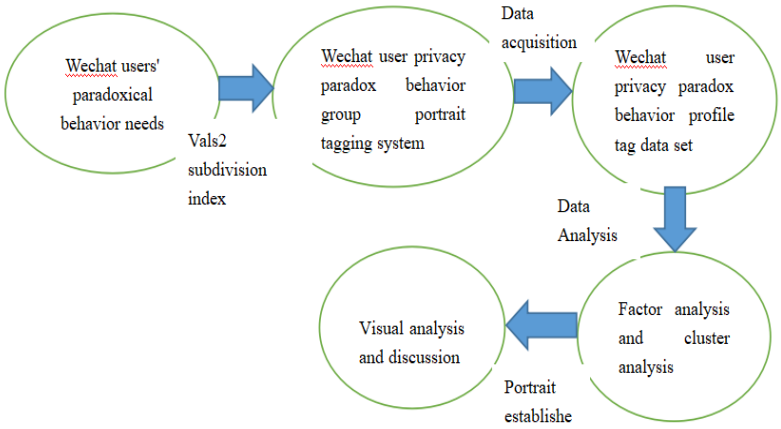

Figure 1. Design concept for constructing portraits of WeChat user privacy paradox behavior groups

3.2 The Construction of User Profile Label System

This article is based on WeChat's usage situation and service function, two parts of VALS2, “User resource-oriented” and “User self-oriented”, are used to design the label system of WeChat users' paradoxical behavior portrait. By combining these two dimensions, we hope to capture the users' paradoxical privacy behavior on WeChat more comprehensively, and provide a useful perspective for the in-depth study of users' psychology and behavior.

3.3 User Resource Oriented

User resource orientation mainly refers to the consumer's own resources in the Vals2 model, including income, education, health, self-confidence, intelligence and ability level, etc., the factors contained in this section may play an important role in WeChat users' paradoxical privacy behaviors, because different groups of people's own resources may affect their attitudes and behaviors in terms of privacy disclosure and protection, for example, research has shown that Internet users' education level is negatively correlated with online privacy disclosure, while their self-confidence is positively correlated with it. This article's WeChat users' Privacy Paradox Behavior Group portrait tag includes two parts: demographic characteristics and user's use behavior, in which the user's gender, educational background and professional are demographic characteristics, user usage time, disclosure status, disclosure habits, user experience, satisfaction and user loyalty were used as variables of user behavior.

3.4 User-oriented

User self-orientation is defined by three self-orientations in VALS2 model, which are “Principle-centered, status-centered and behavior-centered”, this part is helpful to understand the psychological reaction and potential motivation of users on WeChat platform, so as to better understand the reasons of their privacy paradoxical behavior. The establishment of the specific label starts from the psychology of WeChat users' privacy paradoxical behavior and the influencing factors that stimulate users' privacy paradoxical behavior, referring to the relevant literature about the paradoxical behavior of privacy and Vals2 theoretical model variables for reference, at the same time to meet the values of the scale of “What resources to meet my needs” statements to construct the indicator system. Principle-oriented means that users are influenced by the objective information they receive and are not influenced by the opinions of others, such as WeChat information release function, privacy settings function, privacy policy and interface check function, payment security function, location service function; Status-oriented means that users make changes due to other people's behavior or views, such as WeChat users' retweeting, comments, double-click support or like behavior, etc. Behavior-oriented means that users are likely to be stimulated by the external environment to change, such as WeChat platform new experience, additional rewards, personalized recommendations are likely to affect users' privacy disclosure behavior. Based on the description and analysis of the above two orientations, this paper constructs a group portrait tagging system of WeChat users' privacy paradox behavior, in which user resources contain 9 tagging items, user self-directed contains 23 tab title items. At the same time, in order to standardize the processing, the meaning of each measurement sentence is extracted and summarized, as shown in Figure 2.

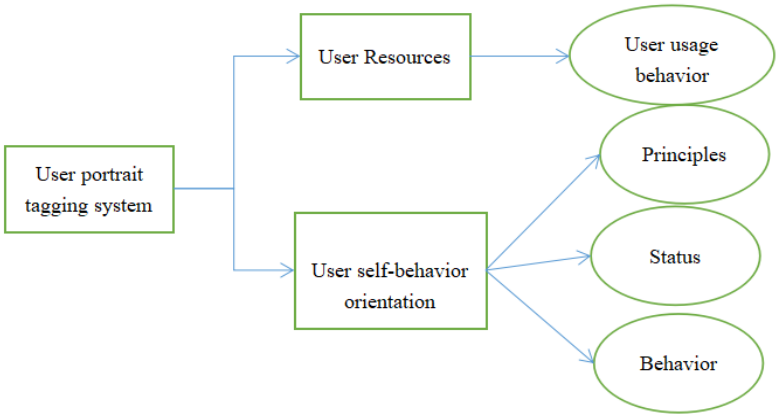

Figure 2. Design of user portrait tagging system

3.5 User Profile Label Weight Design

The differences of social media users' privacy paradoxes are reflected by the weight design of the labels, and the weight (i. e. the degree of importance) of different WeChat users' group characteristics on the same label is different. In this paper, the psychological behavior preference label constructed by Vals2 index system can represent WeChat users' behavior needs and perceived attitude values in a short time, therefore, with the help of Likert 5 scale to WeChat users

in a certain degree of preference for a label to judge. Some of the questions were described by attribute value method, such as gender, educational background, major, duration of use and related items of disclosure information type, the weight of the rest items is mainly determined by the average of the user's score in each label scale, which forms the design of the user's label weight.

Questionnaire design and data collection

The questionnaire is divided into two parts: user resources and user self-orientation. The first part is user resources, including demographic characteristics and user behavior survey, demographic characteristics of WeChat users including gender, education and professional, etc., the user behavior survey includes WeChat users' usage time, disclosure status, Disclosure Habits, user experience, satisfaction and user loyalty, based on Vals2, the psychological preference of WeChat users' privacy paradoxical behavior was measured, and Likert 5 scale was used to collect data. Before the formal issue of the questionnaire, the use of pre-survey method to amend the questionnaire, the revised questionnaire through the questionnaire star, QQ, WeChat and other platforms issued recycling. The demographic characteristics of the study sample are shown in Table 1.

Table 1. Demographic characteristics

Statistical characteristics of the sample	Category	Frequency	Percentage (%)
Gender	Male	877	43.86%
	Female	1123	56.14%
Education	Junior College	170	8.48%
	Undergraduate	1251	62.57%
	Master	508	25.44%
	Doctor's degree	71	3.51%
Major	Philosophy	64	3.22%
	Economics	392	19.59%
	Law	82	4.09%
	Education	64	3.22%
	Literature	123	6.14%
	History	41	2.05%
	Science	117	5.85%
	Engineering	526	26.32%
	Agronomy	29	1.46%
	Medicine	29	1.46%
	Military Science	12	0.58%
	Management	497	24.85%
	Art	23	1.17%
Job	Teacher	201	10.07%
	Doctor	271	13.58%
	Labor worker	1423	71.14%
	Government officer	105	5.21%
Age	Teenagers	1265	63.27%
	Middle age	622	31.12%
	Senior age	113	5.61%

As can be seen from the data in Table 1, the number of men and women in the sample is close to 9:11. Most of the educational qualifications are concentrated in the undergraduate and graduate student groups, and the majors cover a wide range of fields. Among them, engineering majors have the largest number of respondents, the second is management, economics and other majors. Most of the jobs are concentrated in Labor worker groups. Most of the ages are concentrated in teenagers.

Reliability and validity test

In order to ensure the accuracy of subsequent user feature analysis, after excluding the relevant variables of demographic characteristics, the reliability and validity of the four items in user's use behavior and 23 items in user's psychological behavior preference were analyzed by using SPSS 21.0 software, the results of the data analysis are shown in tables 2 and 3.

Table 2. Reliability analysis

Cronbach's Alpha	Number of items
0.931	27

Table 3. KMO value and Bartlett's Sphericity Test

Sampling adequate Kaiser-Meyer-Olkin	Measurement	0.894
Bartlett's sphere test	Approximately chi-squared	5941.660
	Degree of freedom	351
	Significance	0.000

Table 2 shows that Cronbach's Alpha is 0.931 and greater than 0.8, indicating that the questionnaire has good internal consistency and high reliability, which meets the requirements of the study. The results of KMO and Bartlett spherical test show that the KMO value is 0.894 > 0.7, sig. The result shows that the correlation of the internal variables is good and the validity meets the standard. The sample is suitable for factor analysis.

Factor analysis

In order to distinguish the types of users effectively and obtain the group difference picture of wechat users' paradoxical privacy behaviors, this paper uses exploratory factor analysis (SPSS21.0) to obtain their characteristic factors. Through the principal component factor analysis (replacing the label item with the extracted text, and setting the maximum convergence iteration number of 25, the eigenvalue is greater than 1), finally, the following data charts were obtained: Figure 3 factorial lithotripsy chart, table 4 total variance interpretation table, and table 5 component matrix after rotation. The data of the above chart shows that when the common factor is 4, the explanation of cumulative total variance reaches 61.89%, which is more than 50%.

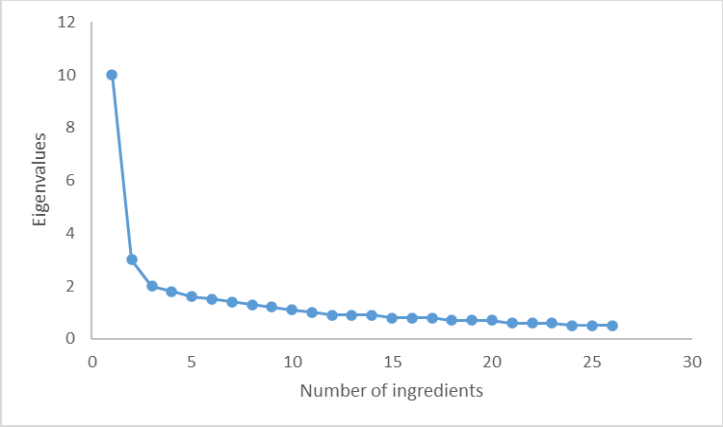

Figure 3. Scree plot

Table 4. Total variance explained by factor analysis

Ingredients	Initial eigenvalue			Extract the sum of squares of loads			Sum of squares of rotational loads		
	Total	Variance %	Cumulative%	Total	Variance %	Cumulative%	Total	Variance %	Cumulative%
1	10.05	37.229	37.229	10.05	37.229	37.229	5.529	20.479	20.479
2	3.092	11.452	48.681	3.092	11.452	48.681	5.222	19.342	39.821
3	1.991	7.375	56.056	1.991	7.375	56.056	3.408	12.621	52.441
4	1.577	5.841	61.897	1.577	5.841	61.897	2.553	9.456	61.897
5	1.103	4.085	65.982						
6	.979	3.626	69.608						
7	.836	3.095	72.703						
…	…	…	…						
27	.118	.436	100.000						

Cluster analysis

After extracting the above-mentioned psychological needs, functional needs, communication interaction and environmental impact, the cluster algorithm is used to cluster the samples to determine the number of behavioral portrait clustering. In this study, we choose the classical K-means algorithm to cluster the sample data, and get the number of different groups of WeChat users' privacy paradox behavior through clustering to realize user portrait

clustering. The key of K-means clustering algorithm in the process of clustering is to choose the number of k-values. In this study, the number of k-values of clustering is defined at 3-6 at the same time, the clustering results will be combined with discriminant analysis Wilks' Lambda method to determine the optimal number of k-values. The final clustering results are shown in table 5.

Table 5. Cluster analysis and discriminant analysis indicators for portraying WeChat user privacy paradox behavior groups

Clustering scheme	Number of clusters 3		Number of clusters 4		Number of clusters 5		Number of clusters 6	
Feature factor	F value	Sig	F value	Sig	F value	Sig	F value	Sig
Psychological need class factor	931.506	0.000	768.204	0.000	681.616	0.000	609.487	0.000
Functional requirement class factor	928.066	0.000	781.796	0.000	639.973	0.000	514.131	0.000
Interactive class factor	314.65	0.000	252.78	0.000	231.692	0.000	228.055	0.000
Environmental impact factors	20.973	0.000	40.069	0.000	34.36	0.000	48.371	0.000
Wilks' Lambda	0.129		0.056		0.025		0.013	
Probability of correct classification (%)	99.1		95.3		97.1		96.8	

As can be seen from table 5, when the number of clusters is 3, the difference of F value is the biggest, indicating that the difference of user behavior group portrait is the most obvious; When the number of clusters changes from 4 to 3, the value increases obviously, which shows that the f-value is the best, that is, the effect of user behavior group portrait is the best. At the same time, when the number of clusters is 3, the probability of correct classification reaches 99.1%, which shows the superiority of this classification scheme. Therefore, this study determines the user behavior group portrait category for 3 categories. The final cluster center values corresponding to each feature factor are extracted from SPSS, as shown in Table 6. It can be seen that there are obvious differences among the three types of user profiles on the four feature factors.

Table 6. Mean centroid values of various feature factors for clusters when set at 3

User profile number	Psychological need class factor	Functional requirement class factor	Interactive class factor	Environmental impact factors
Class 1	-0.29214	0.68089	0.04403	0.22286
Class 2	0.03468	-1.13244	0.54807	0.39365
Class 3	0.49041	-0.00772	-0.67121	-1.00831

3.6 Visualization of User Profile Features

According to the above-mentioned user profile clustering analysis results and related data statistics, wechat users are divided into three types: experience-oriented, mature and rational, and self-centered. The font size of each feature variable is determined by the mean value of the corresponding user portrait. The larger the font size in the tag cloud, the more significant the feature is in the group, and the smaller the font size is, the lower the significance of the feature is. In addition, data on other demographic characteristics are presented in a statistical scale, as shown in table 7 and visualized from figure 4 to 8.

Table 7. Types and characteristics of WeChat user privacy paradox behavior groups

Type of user portrait	Experience-oriented users		Mature and rational users		Self-centered users	
	Security-aware	Operation Experience	Social dominance	Main used utility model	Emotional needs type	Material demand type
Characteristic factors	Functional requirement class factor		Interaction, environmental impact factors		Psychological need class factor	
Gender distribution	Male: 39.7%	Female: 60.3%	Male: 48.3%	Female: 51.7%	Male: 45.2%	Female: 54.8%
Distribution of educational qualifications	Bachelor's degree: 67.3% master's degree: 26.5% doctor or above: 6.1%		College: 5.8%; undergraduate: 60%; Master: 32.9% doctor or above: 1.1%		College: 11.5%; undergraduate: 62.5% Master: 22.1%; doctor and above: 3.8%	
Professional distribution	Philosophy: 2%; Economics: 28.5%; law: 2%; Literature: 4% Science: 8.1% engineering: 34.6% Military: 4%; management: 16.3%		Philosophy: 4.7%; Economics: 21.1%; law: 7% Education: 3.5%; literature: 2.3%; History: 1.1%; Engineering: 28.2%; Medicine: 3.5%; management: 28.2%		Philosophy: 2.8%; Economics: 16.8%; law: 3.3% Education: 3.8%; Literature: 8.1%; History: 2.8%; Science: 7.6%; Engineering: 23.5%; agriculture: 2.4%; medicine: 0.9% Management: 25.4% art: 1.9%	
How long use wechat every day	Less than 1 hour: 4%; 1-3; hours: 22.4% 3-5 hours: 12.2% 5 hours or more: 61.2%		Less than 1 hour: 2.3% 1-3 hours: 23.5%;3.5; hours: 44.7%; more than 5 hours: 29.4%		Less than 1 hour: 2.8% 1-3 hours: 16.9% 3-5 hours: 26.4% 5 hours or more: 53.7%	
Use wechat to disclose information types	Personal basic information: 87.7%; personal social information: 75.5%; personal property information: 24.4%; internet information: 59.1%		Basic personal information: 85.8%; personal social information: 67%; personal property information: 51.7%; Internet Information: 71.7%		Personal basic information: 88.4%; personal social information: 67.3%; personal property information: 37.5%; Internet Information: 57.2%	

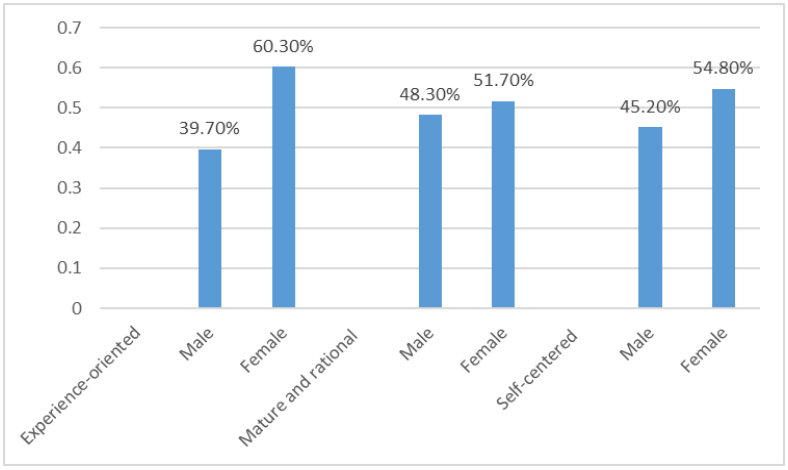

Figure 4. Gender distribution

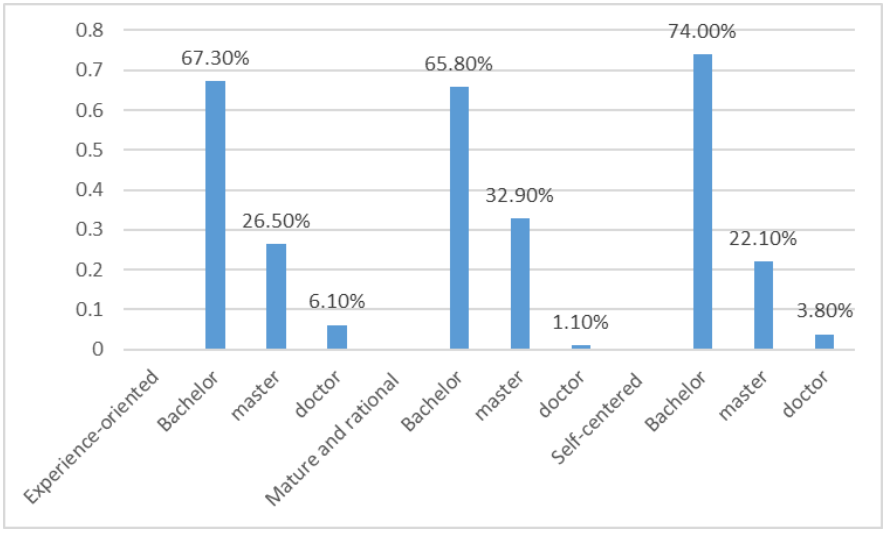

Figure 5. Distribution of educational qualifications

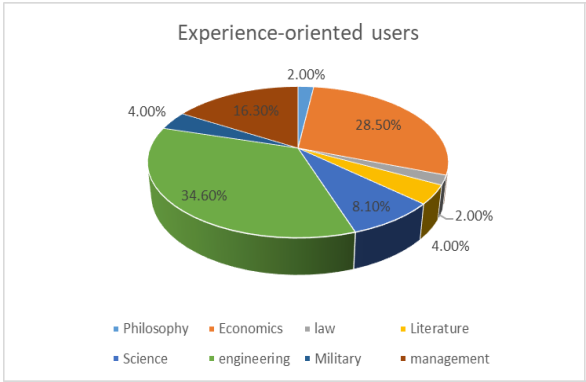

Figure 6(a). Experience-oriented users

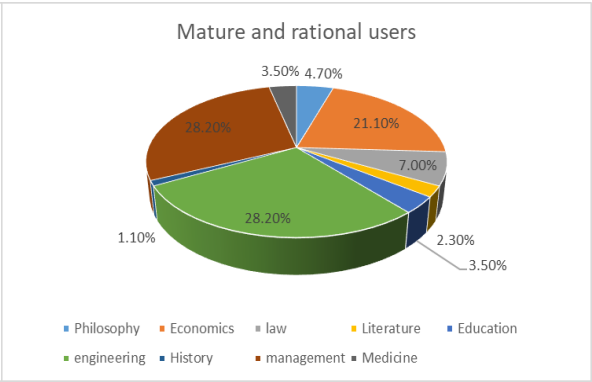

Figure 6(b). Mature and rational users

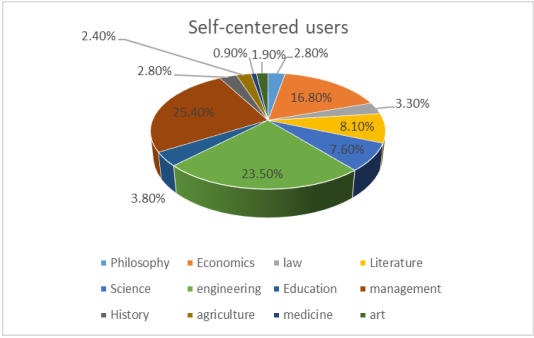

Figure 6(c). Mature and rational users

How long use WeChat every day

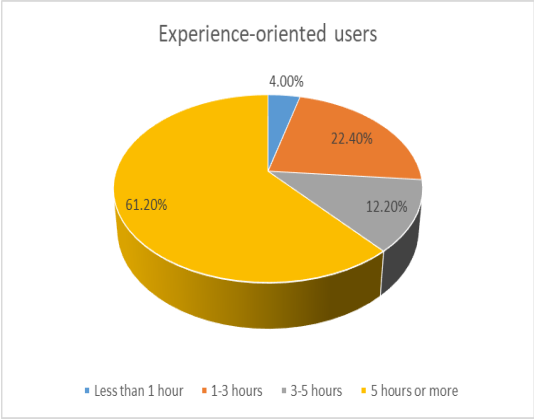

Figure 7(a). Experience-oriented users

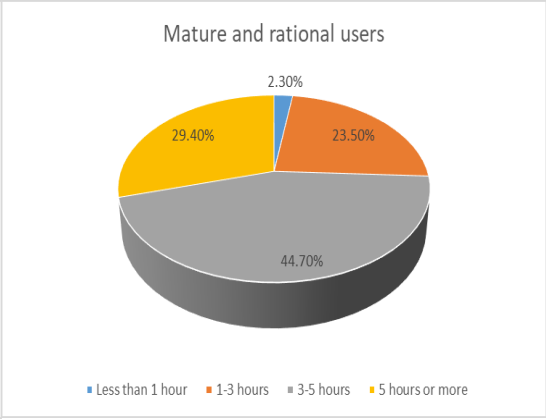

Figure 7(b). Mature and rational users

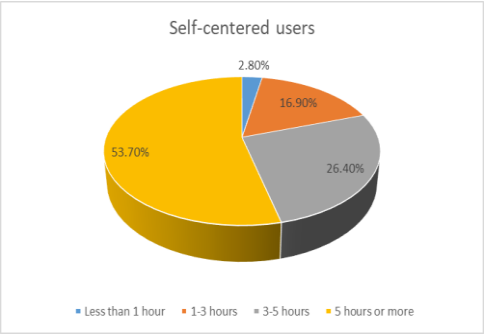

Figure 7(c). Self-centered users

Use WeChat to disclose information types

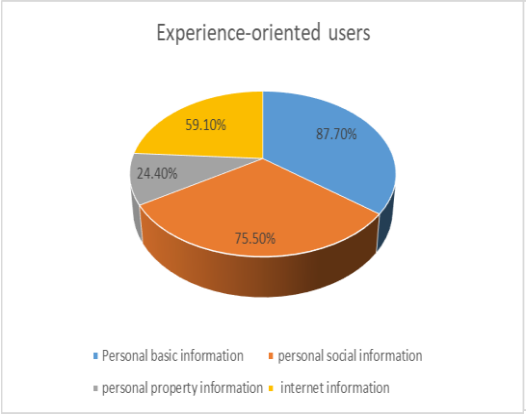

Figure 8(a) Self-centered users

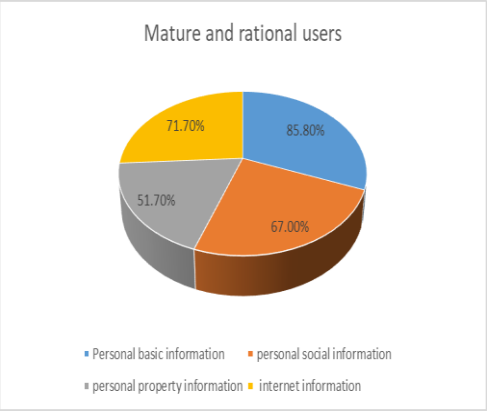

Figure 8(b) Mature and rational users

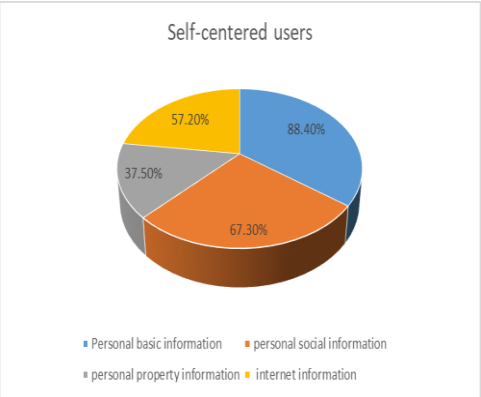

Figure 8(c). Self-centered users

4. Results

Based on the above analysis and visualization results, the key characteristics of various types of users are summarized and described as follows:

4.1 Portrait Characteristics of Experience-oriented Users

Experience-oriented users show that this group of users pay more attention to the use of WeChat when their own experience, service satisfaction has a greater impact on such users to disclose private information. Technical integrity, readability, interface identification, authorization and reliability are the main features of this type of users. As an important part of users' life and work, WeChat's experience in service level and privacy protection will affect users' willingness to disclose information. From the demographic characteristics, the overall education level of this group of users is relatively high, indicating that the group of users have a certain level of privacy awareness and high skills, when disclosing personal information, you can carefully weigh the functional experience and security experience brought by WeChat services. The proportion of users who use WeChat for more than five hours is the highest, and the type of information disclosure is concentrated in basic information and social information, and less disclosure of property information, it shows that although this kind of users use WeChat for a long time, but in the process of use for some sensitive information security protection awareness is high. Based on the above features and influencing factors, the users can be classified into two types: security-aware type and operation-experience type.

Security-aware users. Security-aware users are those who choose to disclose personal privacy information on WeChat because of the good privacy and security experience of the platform in such aspects as complete technology, clear and readable privacy policy, reliable authorization and reasonable information collection. In the era of big data, people have gradually fallen into the network "Transparent person" embarrassment, users often need to use personal information in exchange for corresponding services, to some extent, users' perception of privacy information security will affect their behavior of disclosing privacy information. But today's flow of personal information is the trend, users of the sense of privacy security is a large part of the service provider's respect for their right to know, users need to be aware of how their personal information is collected and used by social media platforms. Therefore, for such user groups, the wechat platform should constantly improve and update information security technology, and at the same time strive to promote users' in-depth understanding of the platform's privacy policy, which can be achieved through the application of visualization technology, pass the privacy policy to the user in the form of pictures, videos and other concise ways, especially for the professional terms that may affect the user's understanding in the privacy policy, using the method of combining pictures, texts and videos to explain, improve the readability and readability of privacy policies to increase users' security awareness and satisfaction.

Operating experience users. Operational experience users are those who disclose private information on WeChat because of their good operational experience in platform operation, privacy setting, information release, personality recommendation and so on. Compared with security-aware users, operation-experience users have more explicit requirements for WeChat platform's functions and operation, and the ease of operation of the platform's functions and services has an impact on users' privacy disclosure behavior. For such users, WeChat platform should continue to optimize the platform operating interface, enhance user use and privacy settings convenient operation, to provide better user experience. At the same time, we can collect the user's experience and suggestions regularly, understand the user's needs for user interface, personalized services and privacy protection changes, based on which to optimize the platform upgrade, constantly improve the user's operating experience. Comprehensive experience-oriented in the “Security awareness” and “Operating experience” type of two types of users can be found, users of the WeChat platform to provide privacy protection and operation functions are more concerned about, have a clear understanding of their needs

and capabilities in terms of privacy protection, privacy disclosure and operational techniques. Therefore, for this type of users, WeChat platform should constantly improve the self-discipline awareness of the industry, reasonable protection and use of user privacy information, improve service functions, enhance user service experience.

4.2 Portrait Characteristics of Mature and Rational Users

Mature and rational users show that WeChat users have a clear goal when they disclose personal privacy information, and will rationally decide the breadth, depth and time of information disclosure according to their own needs. Clear requirements, social interaction, group ownership, payment security are the main features of this type of users. In this kind of user, the undergraduate and the master's degree occupy the highest proportion, uses the time in "3-5 hours" the user most, the disclosure information type distribution is more balanced, this shows that these users have a high level of privacy awareness and technical operation, they can rationally control the use of time, through reasonable disclosure of privacy information to meet the corresponding needs. Based on the above characteristics and key factors, the users can be divided into two types: "Social-oriented" and "Practical-oriented".

Social-driven users. The social-dominant users are the groups of users who can communicate with others or gain their approval by disclosing private information. After many years of development, wechat has gradually changed from the initial social acquaintances to semi-acquaintances, a part of wechat users through their work, life, hobbies, emotional changes and other personal information published to the Friends Circle, to interact with more people, gain recognition from friends with similar interests, and meet new people. Under the strong social demand, users will disclose their privacy information continuously or more comprehensively, and pay more attention to the sense of belonging and social relationship brought by social interaction. For this group of users, WeChat platform needs to meet the needs of user self-image construction, social interaction through different technology and service innovation, to improve the user's willingness to use wechat; At the same time, it can enhance the users' effective social experience by increasing the users' self-management authority of the circle of friends, so as to stimulate the interest of the active social users and create a good interactive atmosphere on WeChat.

Utility for the main user. The utility-oriented users are those who are willing to disclose their private information on WeChat for the sake of enjoying the location service, browsing rights and other services in the WeChat platform or believing that WeChat has a high technical level in payment security, privacy protection and so on. Users who have clear service or technical needs and have their own views and assessments of the risks of privacy disclosure, rather than being limited to simple communication interactions, are more socially dominant, it's about practicality. For example, for the transaction convenience choice binding bank card, for the convenience of personalized recommendation or search authorization WeChat collect their location information. For this group of users, the WeChat platform should more from the perspective of user needs, when developing or promoting new service products, focus on the user's use needs and privacy and security requirements, enhance the user's personalized experience of service products, so that users have more motivation to use the continuous. From the mature and rational type of "Social-oriented" and "Practical-oriented" type of two types of users found that users can have a clear use of the need to disclose their own privacy information, it is believed that the benefits of social interaction, service use and other real-time needs meet the perceived greater than the potential risk of privacy disclosure, so in the use of wechat to implement the disclosure of private information behavior.

4.3 Portrait Characteristics of Self-centered Users

The self-centered users show that WeChat users mainly consider the satisfaction of their emotional and material needs when they disclose private information, and are not easily affected by external factors such as platform and environment, this kind of user can decide whether to disclose the privacy information according to the trade-off between the self-demand and the privacy risk. Perception of pleasure, identity, maintenance of relationships, habits, etc. are the main characteristics of such users. From the point of view of demographic characteristics, college and undergraduate users accounted for a higher proportion, the most extensive in the professional distribution, the use of the length of "More than 5 hours" users accounted for more, the disclosure of personal property information is relatively small, this shows that the group of users is relatively young, in the WeChat disclosure of private information is usually only considered their own feelings, impulsive disclosure may be more. By sorting out the characteristic factors of this type of users, it can be divided into two types: "Emotional demand" and "Material demand" users.

Emotional users. Emotional users are those who want to gain the identity of others or maintain the emotional connection with others by disclosing their private information, so as to gain emotional pleasure. This group of users are easily affected by the feelings of the implementation of privacy disclosure behavior. Today, WeChat has become an important channel for many people to vent their emotions and seek emotional support from non-specific people. Emotional fluctuations can easily affect users' privacy perception and perception of privacy risks, and over-disclosure of their private information. For such users, WeChat platform should strengthen the function of privacy risk alert, through a variety of ways to display the privacy policy and privacy risk information, to help users timely ease the emotional impact of rational disclosure of privacy information.

Material demand type users. Material-demanding users are those who choose to disclose personal privacy information driven by additional incentives and fresh experiences. More than emotional needs of users, this group of users pay more attention to material, fresh and other rewarding needs to meet. After years of development, WeChat has gradually built an ecosystem that integrates social interaction, consumption, travel, finance and other aspects, users may choose to disclose their privacy in order to obtain material and rewarding benefits. For this kind of users, WeChat platform and partners can set up some incentive mechanism to guide users to reasonably disclose the corresponding privacy information, and promote the sustainable development of WeChat social and business ecosystem. Combining “Emotional demand” and “Material demand” two types of specific users can be found, users of WeChat platform on the specific service functions and personal information collection and utilization of the situation is fuzzy, for personal privacy information protection awareness is not strong, easily affected by the internal and external environment. Therefore, on the one hand, WeChat platform and its partners should increase the publicity of specific services, guide users to actively understand the platform's new functions, understand the value of personal information and reasonable use; On the other hand, we should strengthen the protection of privacy information, guide users to disclose privacy information reasonably, and create a healthy network space environment.

4.4 Comparative Analysis with Other Social Media Platforms

In social network systems, the types of relationships can be classmates, colleagues, family members, and ordinary friends. Users can choose who to share with on the sensitivity of the private information, for example, Sina Weibo platform provides functions of grouping friends and setting the visibility of Weibo groups. The proximity of relationships refers to the distance between users in a social network. Users can set privacy policies based on the closeness of their relationships. example, the Facebook platform offers a friend feature. By selecting this setting, a user's status information can be seen by friends.

Facebook: It provides personalized sharing options (Share this with: Friends of Friends, Friends, Specified People or Lists, Only Me) when users edit personal information, but the granularity that these access control policies can describe is limited and cannot meet the privacy protection needs of social networks, and the types of roles and closeness of relationships cannot directly correspond to the strictness of privacy settings.

Weibo: users' self-efficacy, platform trust, and collectivism tendency are self-perception variables that are innate to individuals, influenced by environment and social culture. These variables significantly and positively affect users' intention to disclose privacy, thereby promoting the behavior of disclosing personal privacy. Weibo users are fully aware of privacy risks, which is mainly due to the boundless nature of the Weibo platform and the " box" of intelligent technology, and the uncertainty of information flow and the "technological ignorance" of how it is collected and used by the platform aggravates users privacy concerns; Weibo users tend to prioritize their own needs, and even though they are aware of the risks of privacy collection, disclosure, and secondary use, still disclose personal privacy information out of the desire for social capital, group belonging, and self-disclosure; the behavior of Weibo users in disclosing privacy is obviously by their own cognizance and values, and due to the bias in their self-perception, Weibo users always optimistically estimate their own privacy situation, that the possibility of privacy disclosure happening to them is small, thus continuing to disclose privacy.

WeChat: It was evident to indicate from table 7, As the increase of educational qualifications, less emphasis will be on the WeChat user privacy paradox behavior； Much more emphasis of WeChat user privacy paradox behavior will be on the major of management, Engineering, while literature, art and philosophy accounts less. So, it is not hard to tell a person could touch with more fields out of WeChat information after receiving higher education and participation with social life instead of caring too much attention on WeChat privacy.

4.5 Influence of Other Factors

How enhanced privacy settings affect user trust

The existing social network access control systems usually use relationship types and relationship distances for privacy settings, which cannot well meet users' privacy protection needs. that trust is an important measure of user relationships and can directly correspond to users' privacy settings, this paper incorporates trust into social network access control systems and proposes a network privacy protection mechanism based on trust. Using trust as the core mechanism of access control ensures that private information can only be accessed by trustworthy users. The purpose mechanism is adopted to limit the intention, which can ensure that private data is only used for the correct purposes. And the duty mechanism can enhance users' awareness of privacy data. Divide the user's privacy information into several information units, and make access control decisions with information units as nodes, so that the granularity of access is finer, and at the same time, under the premise of ensuring the security of privacy data, the visibility of information is increased, thus increasing the availability of networks. Based on the trust degree, it better meets the needs of privacy protection. The trust degree is a result of comprehensive consideration of various features, it can correspond more directly to users'

privacy settings needs than the types of relationships and the categories of relationships. Even if users have set stricter access controls for privacy information according to the types or categories of relationships, there are still potential unsafe factors within the group of users who can access this information. By calculating the trust between users and setting permissions based on the trust degree, these unsafe factors can be reduced to some extent.

How cultural context influences privacy attitudes and behaviors

The highly contextual nature of privacy leads to the influence of region and culture on it, and previous research has also paid little attention to the impact of and cultural factors on privacy paradox behaviors. As the value base of socialist culture, the tendency of collectivism also affects the privacy disclosure behavior of Weibo users. Affected by the social and cultural environment, in the context of local Chinese culture, Weibo and WeChat platforms have significant differences, with the former more open and flexible structures, making the ways users interact free and unrestricted. The social culture emphasizes the fulfillment of higher-level needs, especially when safety needs are not as urgent and do not significantly impact survival and development. such cases, the need for love and belonging surpasses safety needs. That is, although people are concerned about privacy security issues, their ignorance of technology of usage satisfaction tip the scales towards the fulfillment of love and belonging. Therefore, people disclose personal privacy information out of the motivation to gain a sense of belonging leading to the occurrence of privacy paradox behavior.

5. Conclusion

WeChat has become an important "Stage" for people to show themselves in their work and life. In order to better serve users and maintain the continuous development of WeChat, WeChat platform should grasp the user's personal information disclosure behavior and psychological characteristics, mining and analyzing the specific needs of different user groups. Understanding and mastering the portrait types of different groups of WeChat users can accurately understand the behavior intention and psychological needs of users to disclose private information, so as to provide users with more personalized and detailed services. Therefore, based on the user profile technology and Vals2's user market segmentation method, this study constructs a labeling system of WeChat users' privacy paradoxical behaviors, and makes a group portrait and classification of WeChat users' privacy paradoxical behaviors, through the data collected by the questionnaire and the empirical subdivision of the experience-oriented, mature and rational type, self-centered type of three different groups, and further subdivided into security perception, operation experience, social-oriented, practical-oriented, emotional needs and material needs of 6 specific types of differentiated user groups portrait type. The study found that WeChat users' privacy disclosure behavior has obvious group differences, and we should abandon the current practice of treating WeChat users as a group and providing them with homogeneous services, instead, it chooses to provide precise services and personalized privacy protection measures for different user groups through classification management.

This study provides a new perspective for the study of social media users' privacy paradoxical behavior, and also brings some references and suggestions for the operation and service of WeChat platform, however, there are still some limitations: 1 the research uses questionnaire method to obtain the label data of user profile, which may have the problems of small sample size and insufficient diversity; 2 the survey sample group is only limited to WeChat users, and the image tagging system cannot be completed for other social media platforms. In the future research, we should revise, expand, evaluate and validate the social media users' privacy paradox behavior group portrait model, in order to be able to reflect the characteristics and dynamic changes of users' privacy paradoxes on different social media platforms more comprehensively and objectively, it provides reference and practical support for social media platform to collect and utilize users' privacy, guide users to disclose privacy information carefully, and promote personal information security together.

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Authors contributions

Dr. Lin Lyu and Prof. Lily Suriani Binti Mohd Arif were responsible for study design and revising. Dr. Lin Lyu was responsible for data collection. Dr. Lin Lyu drafted the manuscript and Prof. Lily Suriani Binti Mohd Arif revised it. All authors read and approved the final manuscript.

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No additional data are available.

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