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Silence or expression? Spiral of silence in social networks

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Abstract

Social networking sites such as Facebook have become the leading social platforms. However, publicly expressing opinions on Facebook may mean that a person has problems with isolation and is observing his or her environment. People who perceive their opinions as belonging to the majority will publicly express them. On the contrary, people who perceive their opinions as belonging to the minority will remain silent, which will lead to a spiral of silence theory. The purpose of this study is to explore the phenomenon of silent spirals in social and psychological capital networks by using social network users in Taiwan as the research subject. Structural equation modeling is used to verify the causal relationship between the research hypotheses and variables. Results show that there are significant differences in the mediation effect. Finally, this study presents conclusions and research directions.

Keywords: Psychological capital, Social networking sites, Spiral of silence theory, Structural equation modeling.

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1. Introduction

We Are Social and Hootsuite, recently released the “2020 Global Network Usage Survey Report,” which showed that the number of Internet users exceeded half of the global population. The use of social media has surged by more than 20% in 2019, compared to the 21% growth of the previous year. Nearly 2.8 billion people worldwide use social networks at least once a month, and users of social media have increased to 4.82 billion. Moreover, the growth of social networks has led to the development of social platforms. Mark Zuckerberg recently announced that Facebook has reached 2 billion monthly users, accounting for a quarter of the world's population.

Social media has become increasingly popular with the advancement of mobile devices and the Internet. The Internet has become a space for users to interact and form substantive relationships, and “commenting” has become the core of interaction on social media [1]. The public’s collective aphasia in media has spiraled Internet freedom, jeopardizing social stability. It has become an urgent problem that should be solved to develop future modern network groups. The spiral of silence (SOS) was originally used for expressions in face-to-face situations [2]. Expressing opinions on social media depends on the individual’s assessment of the climate of opinion, Noelle-Neumann [3]. Kennamer [4] pointed out that Noelle-Neumann was too focused on the influence of the media, ignoring the influence of the reference group. The reference group of an individual will also affect his or her views on specific issues. Moreover, these individuals will not feel that their opinions belong to the minority [5]. Therefore, when the opinions of the reference group are consistent with those of the individual, it is possible for the individual to express his/her opinions. Luthans and Youssef [6] proposed that psychological capital (PsyCap) refers to the positive psychological characteristics of individuals, and people with superior PsyCap will have increased job performance. PsyCap refers to a positive psychological state manifested by individuals during growth and development. It is a core psychological element that transcends human and social capital. Additionally, PsyCap refers to psychological resource that facilitates individual development and enhancing overall performance. This study explores an individual’s opinion distribution in his or her perceived environment based on silent helix theory, and the individual’s PsyCap is then used to judge the final action. It is hoped that we may understand the diverse views of netizens by understanding the relevant variables of the theory. The primary objectives of this study encompass two aspects. The study initially examines the behavioral patterns exhibited by users of Facebook through online events, and subsequently investigates the presence of a phenomena known as the silent spiral inside the online community.

2. Literature Review

2.1. Spiral of Silence Theory

The spiral of silence theory proposed by Noelle-Neumann [7] has mainly been used in elections. Noelle-Neumann [8] pointed out that the premise of the silent spiral theory is fear of isolation; therefore, people will closely observe the environment they live in. This ability to observe comes from the inherent “quasistatistical organ” that allows people to perceive the climate of opinion by assessing the distribution and supporting their opinions in their environments to determine where they stand [3]. This behavior will further affect the perception of others’ climate of opinion, strengthening those with strong opinions. As the spiral increases, the intensity becomes stronger than it actually is. Meanwhile, people with weak voices will allow the spiral to become weak until it vanishes; hence, the silent spiral.

Spiral of silence theory contains several key hypotheses [9]. First, out of fear of isolation, people use quasistatistical organs to monitor the distribution of their climate of opinion to see if it is in line with public opinion [3]. Second, people sometimes misunderstand and regard their views as a consensus of public opinion, which affects their willingness to express “minority” opinions out loud [9]. This process uses the opinions of a few people as the main opinion, resulting in a silent majority. Furthermore, this mechanism enables a minority of individuals who are prepared to voice their thoughts to transform into the “effective” majority. Thirdly, individuals assess the prevailing public sentiment before to articulating their own viewpoints in order to align them with the prevailing consensus.

2.2. Psychological Capital

Seligman [10] argued that a positive mental state can enhance an individual’s physical and mental health, which contributes to the performance of individuals and organizations. Luthans [11] brought together positive psychological issues and conceptualizes PsyCap as a structure of effectiveness, hope, optimism, and adaptability. Positive PsyCap is “the positive evaluation a person gives to whatever change or challenge he/she encounter and makes an effort to achieve success through his/her positive psychological resource ability as a positive psychological development”. Avey, et al. [12]; Avey, et al. [13] and Luthans, et al. [14]. Luthans [15] proposed positive organizational behavior (POB) to adopt positive psychology to organizational behavior. Luthans defined POB as the positive psychological development state of an individual, which is composed of four positive personalities, namely, efficacy, hope, resilience, and optimism [16]. Training is believed to improve the level of employees’ PsyCap [13, 16-18]. In addition, once developed, PsyCap resources tend to last a long [19].

2.2.1. Self-Efficacy

Self-efficacy means that a person can successfully complete a specific task Bandura [20]. Hobfoll [21] argued that self-efficacy is an important personal resource that is used to respond to stress by influencing people’s responses to potential resource losses. In particular, having a high sense of self-efficacy can alleviate the negative impact of job insecurity on performance. People with high self-efficacy may feel that they are capable of successfully responding to potential unemployment challenges. Inefficient people tend to devote less energy and abandon difficult tasks, whereas highly efficient people show interest and motivation, which lead to improved performance [22].

2.2.2. Hope

People who are hopeful and optimistic tend to think independently. They not only try to achieve their goals but also consider multiple approaches in the face of obstacles [23]. Hope has been recognized as an important predictor of academic achievement [23] and organizational performance Peterson and Luthans [24]. Luthans [25] believed that hope is a positive motivational state and a goal-oriented thinking process that seeks to achieve goals through a path and motivational thinking [26]. Moreover, hope is a state that can be developed through willpower and strategic action to reach desired goals.

2.2.3. Optimism

Scheier and Carver [27] argued that optimism is when an individual expects positive outcomes in the face of uncertain environments. Optimism is a permanent and universal advantage that can adapt to changes in the environment and create satisfactory performance Luthans and Youssef [6]. Luthans, et al. [14] considered optimism, which is the belief that the future is positive, as one of the elements of PsyCap. Maintaining an open attitude is a positive attribute for the present and the future; however, studies have shown that pessimistic students have higher academic achievements than optimistic ones [28, 29].

2.3. Media Communication Effect

The speed of transferring information has accelerated by a hundred or over a thousand times because of internationalization and globalization. Moreover, the convenience of mass media plays an indispensable role in interpersonal communication. The widespread use of social media has enabled online users to share their opinions freely and has made virtual communication increasingly common [30]. The use of social media is defined as providing users with a mechanism to connect, communicate, and interact with one another through social networking sites and instant messaging [31]. Social media allows users to make acquaintances and strengthen existing friendships [32]. Useful information can be quickly disseminated through social media platforms, and users can expand and maintain their social networks. Moreover, social media communication can be seen as a viral method for spreading information because social media can reach people more easily than traditional media [33, 34].

Online communication on social media may be influenced by various social factors that influence the development of interrelationships [35]. For example, we cannot see people's facial expressions during online communication, and people may be distracted by other issues while communicating. Trust is the key indicator of human interaction. People use virtual communication despite its issues, but for virtual communication to be useful, a minimum level of trust must be established [36].

2.4. Reference Groups

In addition to numerous psychological factors, the opinions of online users are also affected by environmental factors related to their living environments. Inzalicht, et al. [37] proposed the concept of reference groups to study social status. The reference group, which is composed of individuals or groups that significantly affect a person's behavior, mainly confirms its status by comparing itself with other people or groups [38]. A reference group consists of individuals or groups who become a reference for comparison when forming an individuals' attitudes, values, or behaviors Schiffman and Kanuk [39]. Lessig and Park [40] defined the reference group as an actual or imaginary public group that considers individuals' evaluations, desires, or behaviors as significant. Bearden and Etzel [38] pointed out that a reference group refers to a person or a group of people who significantly affect an individual's behavior. Blackwell, et al. [41] argued that a reference group is any individual or group that significantly influences the behavior of others. In addition, the values, attitudes, behaviors, and norms of the group are related to other people's evaluations, behaviors, and expectations. Bearden and Etzel [38] believed that reference groups could influence the purchase intentions of certain types of consumers. Moreover, consumers often use reference groups as a reference for buying decisions [42, 43].

2.5. Silent and Opinion Expression Behaviors

The study of opinion expression originated with the exit, voice, and loyalty model introduced by Hirschman [44]. This model explores the behaviors of employees who are dissatisfied with their jobs. Farrell [45] added "neglect" to the original model and revised it to the exit, voice, loyalty, and neglect model. The study conducted by the authors claimed that the inclusion of employee viewpoints and ideas can serve as a viable approach to addressing organizational challenges. Thus, organizations should encourage employees to express their opinions [46].

Employee opinions can be divided into three categories, namely, suggestions, objections, and cynics. The opinion expression behavior used in the present study is mainly based on provocative behavior, which is part of communication. Communication refers to the communication of ideas between members through which information and ideas can be circulated. Moreover, the function of communication is not only to convey messages but also to be understood by others [47].

Organizational silence originated in the 1970s [3, 48-50]. However, in the study of Morrison and Milliken [51], organizational silence was regarded as a collective phenomenon, meaning that employees' opinions on the organization remained personal opinions. Pinder and Harlos [52] defined employee silence as having the ability to improve the current organization but withholding advice or points of view from the organization. According to Tangirala and Ramanujam [53], silence is a kind of implicit expression of behavior wherein a person chooses to withhold his or her opinion and not speak out. Milliken and Lam [54] argued that the definition of silent behavior is employees believing that opinion expression is useless, thus choosing to be silent.

Silent people in organizations generally do not want to contribute to the company [55], and a silent climate adversely affects the dissemination of important information and organizational innovation [56, 57].

3. Hypotheses Development and Conceptual Background

Figure 1 shows the research model of the study DiMaggio, et al. [58] divided the study of Internet and citizen participation into two categories, namely, optimism and pessimism. Optimists believe that a high degree of resource sharing on the Internet can facilitate the flow of public information. This behavior enables Internet users to quickly acquire public information from a variety of sources and easily discuss social and public affairs on network platforms Livingstone [59]. Luthans, et al. [60] used self-efficacy, hope, optimism, and resilience as the four dimensions of PsyCap. Personal PsyCap is

an individual's inner psychological resources. A person who can systematically develop investment skills can use positive psychology as a competitive advantage. Positive psychology is the key to promoting organizational development and performance improvement [61]. Self-efficacy, which was proposed by Bandura and Wood [62], is a dynamic structure wherein judgments of performances change over time with new information and experience. Bandura [20] believed that though self-efficacy is the most important factor, it is not the only one that determines behavior. Other factors, such as the individual's actual success experience and lack of motivation, also affect the execution of behavior. Therefore, this study infers the following hypotheses:

H1: Media communication effects have a significant and positive effect on self-efficacy.

H2: Media communication effects have a significant and positive effect on hope.

H3: Media communication effects have a significant and positive effect on optimism.

The ideas of the reference group can be applied to the social media environment. Social media allow people to connect with their families, friends, and acquaintances; build personal relationships; and maintain social networks Ellison, et al. [63] and Raacke and Bonds-Raacke [64]. Oshagan [65] found that when reference and social views are equally significant, those who stand with their reference group (closest friends) are more willing to express their opinions out loud than those belonging to the majority in society. This finding indicates that the influence of the reference group on the individual's willingness to speak is stronger than the influence of the majority of society. Moy, et al. [66] also supported the view that after controlling all current climates, only the consistency between personal opinions and the reference group is significant.

Perreault Jr, et al. [67] pointed out that a reference group is the group considered by people when forming an opinion on a particular topic. People tend to find different reference groups for different topics; a few have actual face-to-face discussions, while others only want to imitate the opinion of the reference group. Individuals with positive emotions may have good interpersonal relationships [68]. The interpersonal communication skills and attitudes of individuals with positive mindsets enable them to achieve effective and satisfactory results in social interactions [68]. Thus, this study infers the following hypotheses:

H4: The reference group has a significant and positive effect on self-efficacy.

H5: The reference group has a significant and positive effect on hope.

H6: The reference group has a significant and positive effect on optimism.

Tierney and Farmer [69] pointed out that individuals with self-efficacy resources are less likely to face excessive negative emotions during negative events in the workplace. Moreover, such individuals can use resources that relieve work stress. Individuals with high hopes have a strong belief in their future goals and will not give up easily despite setbacks; rather, they will seek resources to help achieve their goals. People with optimistic traits also tend to interpret negative events as temporary, external, or specific [6]. Therefore, they are likely to slow down negative emotions or attitudes during negative events. Finally, resilient individuals can rise from difficulties and frustrations, face challenges, adjust their personal emotions, and allocate resources in a timely manner during unfavorable work conditions to achieve satisfactory work performance [70]. PsyCap has a direct effect on individual emotions and adverse effects on negative work events [14]. The reasons for silence are multifaceted, and fear is the main emotion behind silent behavior [71]. Therefore, this study infers the following hypotheses:

H7: Self-efficacy has a significant and negative effect on silent behavior.

H8: Hope has a significant and negative effect on silent behavior.

H9: Optimism has a significant and negative effect on silent behavior.

Walumbwa, et al. [72] expressed that efficient employees believe that their opinions are valid and taken seriously by their supervisor and are therefore asked to generate additional suggestions. Liang, et al. [73] indicated that efficient employees are often confident enough to face and bear the risk of making a statement. If an employee's self-efficacy is high, he or she will be active and positive in proposing new methods to solve problems. In addition, he or she is likely to express his or her opinions because if he or she believes that he or she cannot, then he or she will not likely consider improving in the first place [74]. Employees with high self-efficacy can also reduce negative emotions by looking forward to beautiful visions and considering controversies and risks brought about by opinion expression behavior as nothing more than challenges. Hsiung, et al. [75] indicated employees' self-efficacy as their motivation for making suggestions and raising objections. Thus, this study infers the following hypotheses:

H10: Self-efficacy has a significant and positive effect on opinion expression behavior.

H11: Hope has a significant and positive effect on opinion expression behavior.

H12: Optimism has a significant and positive effect on opinion expression behavior.

4. Research Methodology

4.1. Questionnaire Design, Pretest, and Pilot Study

This study explores the behavioral patterns of online users' silent spirals. Therefore, the questionnaire used in this study cited contextual measurement items to measure the proposed variables. Two information management professors and three English language experts were invited to correct the semantics. In addition, three pilot tests were performed for Facebook users. Moreover, this study conducted three trials to confirm the correctness of the final questionnaire.

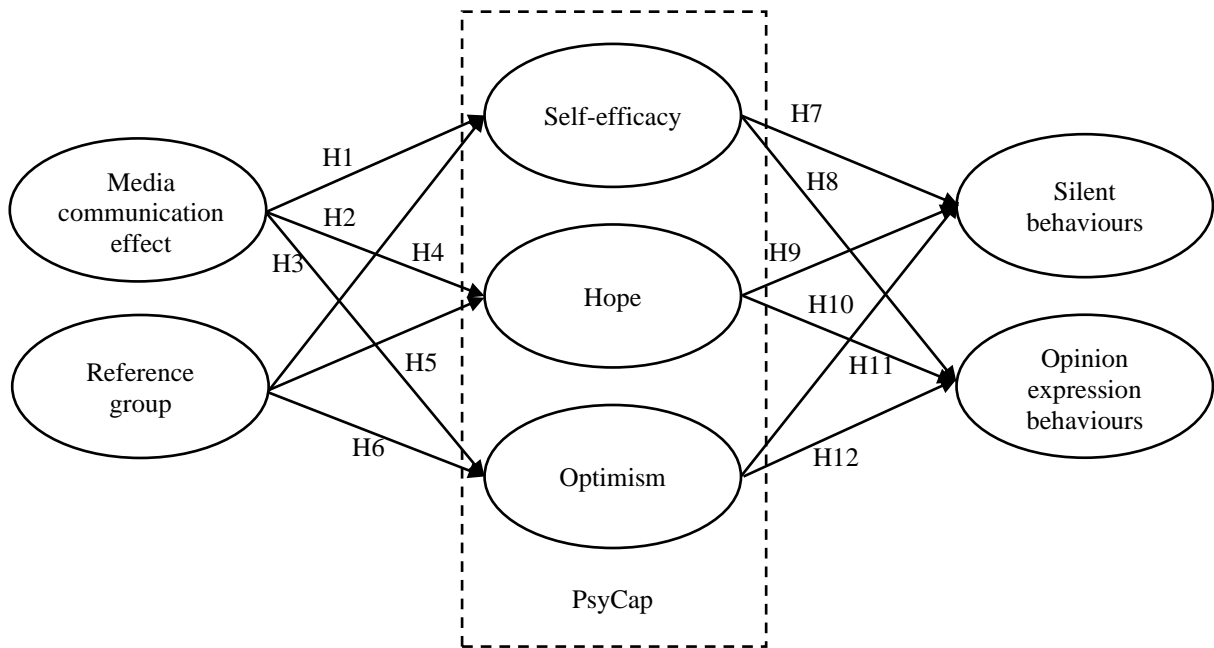


Figure 1.
Research framework.

4.2. Sample and Data Collection

The population of this study was Taiwanese social media users with Facebook accounts. This study adopted questionnaires, statistical analyses methods, and the convenience sampling method as measurement tools. An online questionnaire survey was conducted for online users with experience in online communities.

The respondents answered the official online questionnaire posted on the Facebook and Google websites. A total of 694 questionnaires were collected, 492 (70.89%) of which were valid. The respondents consisted of 224 males (46.4%) and 259 females (53.6%).

The demographic information of the respondents is as follows: 33.7% were 18–20 years old, 46.4% were 21–30 years old, and 16.4% were below 18 years old. A total of 88.4% accessed the Internet more than twice a day, 33.1% accessed the Internet for at least 2 hours, and 82.6% have been using the Internet for more than 4 years.

4.3. Measures

This study explores the behavioral patterns of silent spirals in the context of online community users. This study used “legalization of same-sex marriage” as the research topic and Facebook as the research field to explore the silent spiral phenomenon in social media. The proposed variables in this study were measured by the items in the survey literature. The operational definitions and sources of the various dimensions are as follows: (1) the media communication effect was defined as “the procedure for transmitting information to others.” It adopted the scale of Palda [76], and six measurement items were developed. (2) The reference group was defined as “the friends in the surroundings of the community website users who influence the attitude or performance behavior of users.” It adopted the scale of Veloutsou and Moutinho [77], and three measures were developed. (3) PsyCap self-efficacy was defined as “in the face of challenges, you can have the confidence to undertake and put in the necessary efforts to complete the task.” It adopted the scale developed by Parker [78], and three measurement items were developed accordingly. (4) PsyCap hope was defined as “in order to successfully move toward the goal, it is possible to re-adjust the way to achieve the goal when necessary.” It adopted the scale of Snyder, et al. [79], and two measurement items were developed. (5) PsyCap optimism was defined as “to have a positive attitude or attribute towards present or future success.” It adopted the scale of Scheier and Carver [27], and two measurement items were developed. (6) Silence behavior was defined as “withholding opinions for self-protection purposes due to the fear felt when using the social networking site.” It adopted the scale of Dyne, et al. [80], and three measurement items are developed. (7) The opinion expression behavior was defined as “expressing personal opinion and views on social media under the influence of psychological factors.” It adopted the scale developed by Dyne, et al. [80], and four measurement items were developed.

5. Data Analysis

5.1. Common Method Variance

This study uses pretests and posttests to avoid and reduce the common-method variance. The first step in common-method variance prevention is to let respondents be anonymous. The questionnaire is randomly configured, and the name of the variable is concealed to reduce the uncertainties in the questionnaire [81].

According to Podsakoff and Organ [82], post hoc testing commonly uses Harman’s one-factor test and exploratory factor analysis to perform common-method variation. The results show that six factors can be extracted, and the explanatory power of the first factor is 33.837%, which did not reach 50% (shown in Table 1). Therefore, the sample data in this study has no serious common-method variation problems.

Table1.
Initial eigenvalues.

Component	Eigenvalues	Variance (%)	Cumulative variance (%)
1	7.783	33.387	33.837
2	3.118	13.557	47.395
3	2.038	8.861	56.256
4	1.312	5.705	61.961
5	1.179	5.127	97.088

5.2. Measurement Mode

The reliability test of the questionnaire includes the item and the dimensions. The factor loading of each item is between 0.628–0.893, which is in line with the load detection standard of 0.50–0.95. The squared multiple correlation of each item ranges from 0.372–0.893, both of which meet the recommended test standard of 0.2 [83]. These results indicate that all items have sufficient reliability [84]. Cronbach's α is used as the basis for proving the validity of the dimensions. If the value of Cronbach's α is less than 0.5, then the result is not credible. The Cronbach's α of all the dimensions is between 0.680–0.893. The internal consistency of the measurement items in the questionnaire is acceptable.

Table 2.
Analysis of measurement model.

Constructs	MLE (Maximum likelihood estimation)		Squared multiple correlation	Composite reliability (CR)	Average of variance extracted (AVE)	
	Factor loading	Measurement error				
Media communication effect				0.885	0.563	
ME1	0.742	0.449	0.551			
ME2	0.781	0.390	0.610			
ME3	0.759	0.409	0.591			
ME4	0.774	0.409	0.591			
ME5	0.731	0.466	0.534			
ME6	0.708	0.499	0.501			
Reference groups				0.869	0.688	
RE1	0.809	0.346	0.654			
RE2	0.803	0.355	0.645			
RE3	0.875	0.234	0.766			
PsyCap	Self-efficacy			0.667	0.401	
	SE1	0.699	0.511	0.489		
	SE2	0.599	0.641	0.359		
	SE3	0.597	0.644	0.356		
	Hope				0.691	0.529
	HP1	0.677	0.542	0.458		
	HP2	0.775	0.399	0.601		
	Optimism				0.672	0.510
	OP1	0.631	0.379	0.621		
	OP2	0.788	0.601	0.399		
Silent behaviors				0.881	0.711	
SB1	0.863	0.255	0.745			
SB2	0.868	0.247	0.753			
SB3	0.797	0.365	0.635			
Opinion expression behaviors				0.912	0.721	
OB1	0.880	0.226	0.774			
OB2	0.832	0.308	0.692			
OB3	0.834	0.304	0.696			
OB4	0.849	0.279	0.721			

Note: ME: Media communication effect; RE:Reference groups; SE:Self-efficacy; HP: Hope; OP: Opinion expression behaviors; SB:Silent behaviors; OB:Opinion expression behaviors.

The composite reliability value of each dimension is between 0.683–0.922, which conforms to the value standard of 0.6. The average variance extracted (AVE) of each dimension is between 0.439–0.747, which conforms to the acceptable standard of Slater, et al. [85]. The AVE also measures this study's differential validity. If the square root of the potential variable's AVE is greater than the correlation coefficient, then the construct has good discriminant validity [86]. Each construct's square root of AVE is indeed greater than the correlation coefficient. Therefore, each construct has good discriminant validity (as

shown in Table 2). Table 3 illustrates that all the correlation analysis between two dimensions are larger than the square root of the AVE of each dimensions to demonstrate validity.

Table 3.
Correlation matrix for measurement scales.

Dimension	ME	RE	SE	HP	OP	SB	OB	CR	AVE
ME	0.750							0.885	0.563
RE	0.603**	0.83						0.869	0.688
SE	0.403**	0.384**	0.633					0.667	0.401
HP	0.362**	0.362**	0.598**	0.727				0.691	0.529
OP	0.293**	0.285**	0.512**	0.466**	0.714			0.672	0.510
SB	-0.037	-0.048	-0.171**	-0.046	-0.101*	0.843		0.881	0.711
OB	0.357**	0.356**	0.556**	0.432**	0.409**	-0.334**	0.849	0.912	0.721

Note: Media communication effect; RE:Reference groups; SE:Self-efficacy; HP: Hope; OP: Opinion expression behaviors; SB:Silent behaviors; OB:Opinion expression behaviors.

The square root of the AVEs for latent variables are shown as the diagonal; * $p < 0.05$; ** $p < 0.01$.

5.3. Structure Mode

The overall model fit ($\chi^2 = 675.138$, df (degree of freedom) = 217, $\chi^2/df = 3.111$, GFI (Goodness of fit index) = 0.888, AGFI (Adjusted goodness of fit index) = 0.858, RMSEA (Root mean square error of approximation) = 0.066) is appropriate. This study uses the recommendations of Hair Jr, et al. [84] to select three indicators, namely, absolute fit measures, incremental fit measures, and parsimonious fit measures. The results indicate that the overall mode of the theoretical model is well matched.

The results of the hypotheses test show Hypothesis H9: “optimism has a significant negative effect on silent behavior” and Hypothesis H8: “hope has a significant positive effect on opinion expression behavior” are not supported, whereas the remaining hypotheses are supported (p value < 0.05).

The theoretical model proposed in this study has a good reference value for the causal relationship of Facebook users in Taiwan, theoretical development, and practical application (as shown in Table 4).

Table 4.
Results of proposed model.

Hypotheses	Path coefficients	Test Results	
H1	Media communication effect→Self-efficacy	0.308***	Supported
H2	Media communication effect→Hope	0.278***	Supported
H3	Media communication effect→Optimism	0.226*	Supported
H4	Reference groups→Self-efficacy	0.322***	Supported
H5	Reference groups→Hope	0.312***	Supported
H6	Reference groups→Optimism	0.249*	Supported
H7	Self-efficacy→Silent behaviors	-0.406***	Supported
H8	Hope→Silent behaviors	0.234*	Supported
H9	Optimism→Silent behaviors	-0.040	Reject
H10	Self-efficacy→Opinion expression behaviors	0.608***	Supported
H11	Hope→Opinion expression behaviors	0.056	Reject
H12	Optimism→Opinion expression behaviors	0.187*	Supported

Note: * $p < 0.05$; *** $p < 0.001$.

5.4. Mediation Effect

The structural model analysis can confirm that media communication effects and reference groups have significant positive impacts on silent and opinion expression behaviors. Therefore, this study further explores the mediating effect of PsyCap on media communication effects and reference groups. In addition to the Sobel test, this study makes use of bootstrapping, as Preacher and Hayes [87] advice. The Sobel test assumes a symmetric distribution in the indirect effect, whereas the bootstrap method is not a symmetric assignment but a satisfactory method to test the effect of the intermediary. The bootstrap method mainly regards the sample as a “parent group,” which is tested by the multimedia test program of Preacher and Hayes [87]. The number of simulated samples, which is set to 5,000 and considered a rigorous and strict inspection of frequency criteria, is determined by Zhao, et al. [88]. The 5,000 estimates present a new distribution; therefore, the confidence interval (CI) can be found if it contains 0; otherwise, the indirect effect is significant.

The Sobel test for the statistical quantification of PsyCap is significantly greater than 1.96, and the bootstrap method is used to simulate 5,000 samplings for accurate testing. Under the 95% confidence level, the CI of the indirect effect of the overall model does not contain 0 in the percentile or in the bias CIs. Therefore, the indirect effect is significant (as shown in Table 5).

Table 5.
Soble test bootstrapping confidence interval of mediator effects.

Independent variable	Mediator variable	Dependent variable	Sobel	Bootstrapping 95% confidence intervals			
				Percentile CI		Bootstrapping method CI	
				Lower	Upper	Lower	Upper
Media communication effect	PsyCap	Silence behaviors	-2.605**	-1.294	-0.183	-1.668	-1.427
Reference groups	PsyCap	Silence behaviors	-2.494**	-0.129	-0.116	-0.102	-0.012
Media communication effect	PsyCap	Opinion expression behaviors	7.776***	0.194	0.325	0.187	0.339
Reference groups	PsyCap	Opinion expression behaviors	7.658***	0.156	0.265	0.152	0.277

Note: **p < 0.01; ***p < 0.001.

6. Discussion and Conclusion

6.1. Discussion

This study is based on the core concepts of the silent spiral and the silent spiral theory of Noelle-Neumann [3]. Humans fear isolation; therefore, they will use their quasistatistical organs to perceive the surrounding climate and future trends and express opinions that conform to mainstream opinions.

This study explores media communication and reference groups through PsyCap to influence user behavior through silent spiral theory. The path in the silent behavior that affects the behavior of Facebook users originates from PsyCap, particularly self-efficacy, hope, and optimism. Therefore, PsyCap directly and negatively affects the silent behavior of Facebook users. Moreover, users will search for interesting information through media or in their reference groups, which affects their silent behavior through PsyCap. However, in seeing reports that differ from their own opinions, users will choose to be silent through their own PsyCap. This study finds that on Facebook, those with the highest degree of fear of isolation are not those who are weak but rather those who remain neutral about issues. This finding may be because those who are vulnerable to isolation are afraid of being isolated by any party and thus are unwilling to express their opinions and choose instead to remain neutral or not express opinions.

The path of opinion expression behavior that affects the behavior of Facebook users likewise originates from PsyCap. Therefore, this study believes that in the context of Facebook users, PsyCap will directly and significantly affect their opinion expression behavior. The results of this study indicate that the higher the PsyCap of Facebook users, the higher their opinion expression behavior. This result explains that users will search for interesting information on the Internet through the media or reference groups but will express their opinions and attach them to publishers only if they share the same opinion. Moreover, this study finds that age, hours of Internet usage, number of friends, and frequency of reading news on Facebook do not predict the willingness to express opinions. However, the higher the frequency of Facebook use to learn about public issues, the higher the willingness to express opinions on Facebook. It is worth noting that the privacy setting of Facebook also affects the willingness to provide opinions. For example, one of the factors that express willingness is when people set their privacy settings to “friends, including friends of friends.” Therefore, this study proves that the hypothesis model has existential value and provides different views on the causal relationship among media communication effects, reference groups, PsyCap, silent behavior, and opinion expression behavior.

6.2. Conclusion

This study explores the effects of media communication and reference groups as the pre-factors for PsyCap (self-efficacy, hope, and optimism) from the perspective of a virtual community. In addition, it confirms that media communication effects and reference groups are suitable for analysis and discussion as pre-factors of PsyCap.

This study explores the silent spiral and PsyCap as its main points. The silent spiral is mostly used in public opinion rather than in online communities. In addition, PsyCap has not been added to the silent spiral theory in previous studies. This study, which is based on the definition of PsyCap, infers the factors that may positively influence the silent spiral and adds them to the model. In addition, because the theory has mostly focused on media communication, it has ignored the importance of reference groups and discussed silent and opinion expression behaviors in the past using only a single theory. The empirical results of this study also verify the importance of media communication and reference groups in affecting silent and opinion expression behaviors.

The PsyCap of Facebook users is explored, and it is found that media communication effects and reference groups are psychological pre-factors. This study also finds that PsyCap (self-efficacy, hope, and optimism) is a prerequisite for silent and opinion-expression behaviors. This finding indicates that Facebook users must first generate values and benefits for the platform to encourage positive PsyCap. The study also determines that when Facebook users impact their media communication effects and reference groups, they will further generate PsyCap (self-efficacy, hope, and optimism), which in turn will affect their silence and opinion expression behaviors.

The rise of social networks has enabled people's interactions to become diversified, and globalization has influenced the trend of social networking sites. However, the competition on social media has become intense. The industry hopes that the platforms it provides can increase profitability through the externality of the network. Therefore, exploring the silent spiral and its impact will help community website operators understand actual public trends and the needs of the users, which is in line with the needs of the majority.

This study establishes a research model based on the theory of the silent helix, and the results show that media communication effects and reference groups are the main pre-factors that affect Facebook users. Therefore, it is recommended that online store operators increase users' actual experiences of advertisements and products to increase external effects when viewing such products and enhance product familiarity. The media and reference groups that affect users will also affect the entire social network and attract additional users to the site.

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