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Self-disclosure in Social Network Sites: An Integration of Stimulus-Organism-Response Paradigm and Privacy Calculus Model

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Abstract: This study aims to research the influencing factors of self-disclosure in social network sites (SNSs). Although much has been reported on the issue of influence factors of self-disclosure, very few have been discussed from the aspect of environment stimulus. Drawing upon the Privacy Calculus model and the Stimulus-Organism-Response paradigm, we developed an integrated model to investigate the impacts of SNSs features as environment stimuli on users' perceived value and subsequently their self-disclosure behavior. The results indicate that self-disclosure in SNSs is determined by the tradeoff between perceived benefits (relationship management and enjoyment) and costs (privacy risk). And users' perceptions of SNSs features (interactivity, personalization and privacy control) have significant impacts on perceived value and self-disclosure behavior.

Keywords: social network sites, self-disclosure, stimulus-organism-response paradigm, privacy calculus model

1. INTRODUCTION

Over the past few years, there has been an exponential growth in the use of social networking sites (SNSs). The development of SNSs partly depends on the user-generated content, while self-disclosure is the foundation of content generation, so it's important to figure out what are the most important factors that influence users' self-disclosure behavior.

Generally, researchers paid more attention to users themselves. For example, some researchers explored how users' perception value influence self-disclosure based on privacy calculus theory and found that the perceived benefits could encourage users self-disclosure intentions, while perceived costs may become the obstacles to their self-disclosure, and the self-disclosure is the result of users' cost-benefit tradeoff^[1]. Besides, age, gender, personality are also important factors to influence users' self-disclosure. On the other hand, in order to avoid becoming outdated without ongoing content creation and sharing, SNSs providers need to keep up updating SNSs to stimulate users involving in self-disclosure, which means, SNSs features may be considered as an important influencing factor on self-disclosure. Although a considerable number of researches have been done to discuss the relationship between website features and the user behavior, such as purchase intention and participation intention, very few have been done to explore effects of SNSs features on self-disclosure. Relative work was done by Wang et al.^[2] who researched the effects of SNSs characteristics on self-disclosure, concluded that application compatibility and reputation positively influences the self-disclosure.

This study aims to explore the influence of SNSs features and perceived value on self-disclosure. Based on the stimulus-organism-response (S-O-R) paradigm and privacy calculus model, we developed an integrated model to examine the effects of SNSs features on users' perceived value, following their intention to self-disclosure. This study makes significant contributions to the existent literature. Firstly, the study focusses on how SNSs features influence self-disclosure indirectly, which was rarely studied. Secondly, this study enriches the research framework of self-disclosure with the S-O-R paradigm.

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2. THEORETICAL BACKGROUND

2.1 Privacy calculus model

The privacy calculus model states that people will disclose personal information when perceived benefits exceed potential costs, which means that online self-disclosures are based on a cost-benefit tradeoff^[1]. There are a large of benefits users can get when self-disclosing in SNSs, such as enjoyment, friendship. At the same time, there are also some risks to be considered, such as privacy risks. So, users have to consider the merits and potential negative consequences with respect to the current interaction as well as future situations. Privacy calculus has been widely used to explain self-disclosure behaviors in SNSs. For example, Krasnova et al.^[3] found that enjoyment can promote users' self-disclosure, while privacy concerns had a negative influence on self-disclosure. Xu et al.^[4] combined the privacy calculus model with the theory of planned behavior to explain privacy disclosure behaviors, and found that privacy risks predicted privacy concerns, which in turn determined self-disclosure.

2.2 The S-O-R paradigm

The S-O-R paradigm states that environmental stimuli can affect people's internal state (organism), which directs their behavioral response. Environmental stimuli refer to the environmental factors that users are exposed in the process of interaction with the environment. The internal states refer to users' emotional or cognitive states, including their perceptions, experiences and evaluations. And the response refers to behavior, such as self-disclosing behavior, purchase behavior. The use of S-O-R paradigm as a theoretical foundation for this study is advantageous for three reasons: First, the S-O-R paradigm is widely used to explore how environmental factors influence users' behavior. For example, Islam and Rahman^[5] explored the impacts of online brand community characteristics on customer engagement behavior using S-O-R paradigm. Second, under the online self-disclosure research, previous studies have indicated that environmental factors such as policy and culture differences, as well as features of social network could influence the process of self-disclosure^[2]. Third, it's also convenient to exam the cost-benefit tradeoff that users perceived while self-disclosing in SNSs.

3. RESEARCH MODEL AND HYPOTHESES

3.1 Model building

Based on the S-O-R paradigm and privacy calculus model, an integrated model is built to explore the influence factors of self-disclosure in SNSs. First, this study takes SNSs features as stimuli, which refer to the properties of SNSs. This study focuses on these three crucial SNSs features, that are, interactivity, personalization and privacy control, which reflect various aspects of users' interactions with SNSs. Interactivity and personalization reflect the features that support interactions between users and SNSs, whereas privacy control reflects the feature that facilitates safer and better interactions. Second, this study takes the perceived value as organism. According to the privacy calculus theory, user's perceived value determines the self-disclosure behavior, while the perceived value is based on environment stimuli represents user's internal state. This study uses perceived value as the mediator of SNSs features and self-disclosure. Perceived value consists of perceived benefits and perceived costs, whereas the behavior is determined by the result of the tradeoff. Studies on self-disclosure confirm the important roles of relationship management^[4], self-presentation and enjoyment^[6] for perceived benefits and perceived privacy risks^[7] for perceived costs. Finally, self-disclosure is taken as the response, which refers that one voluntarily and intentionally reveal about themselves to others in this study.

3.2 Research hypotheses

3.2.1 SNSs features and perceived value

Interactivity is the degree to which one can control the medium in modifying its form and content in real time^[8], which is defined as the interactions between users and technology in this study. As a key design feature, interactivity has been found to influence users' response to an online medium^[9]. First, users can present themselves, create a public profile and make connections with the others. Therefore, the SNSs with high perceived interactivity provide a convenient venue for content contribution and relationship management. Second, interactivity feature in SNSs enables a user to portray a desired self-image. According to the self-presentation theory, people desire to project a social self-image among other users and are motivated to use this medium to fulfill the desire. Third, users interact with the SNSs through content creation and sharing, such as boasting about what they read, think and experience in their daily lives. The social networking sites with high interactivity provide users more enjoyable and relaxing environment. Thus, we hypothesize:

H1a: interactivity is positively related to the relationship management.

H1b: interactivity is positively related to the self-presentation.

H1c: interactivity is positively related to the enjoyment.

Personalization is defined here as the adaptability of the site to meet their preferences^[10]. In SNSs, the design of user profiles and recommendation systems closely match users' preferences and needs. Relevant items are classified under a distinct category which labels a list of friends who have similar tastes or someone that you may know, which create an encouraging environment for users to build new relationships and maintain relationships with others^[11]. When users find social recommendations in a medium, they will develop a stronger sense of social identification and familiarity with other users. Thus, increased identification and familiarity with others may generate a sense of social presence and enhance the individual's well-being among them. Besides, due to information overload in social networking sites, personalization will reduce customers' information screening cost and improve their information-interaction quality, and thus contribute to a better experience and be more likely to gain enjoyment. Thus, we hypothesize:

H2a: Personalization is positively related to the relationship management.

H2b: Personalization is positively related to the self-presentation.

H2c: Personalization is positively related to the enjoyment.

Privacy control means the ability to control users' personal information to avoid being leaked without their permission. For example, the ability to control who can see their information and whether they can be found by strangers in SNSs. Some research results have shown that, the stronger the ability of privacy control, the lower the perceived privacy risks^[12]. Thus, we hypothesize:

H3: Privacy control is negatively relating to users' perceived privacy risk.

3.2.2 Perceived value and self-disclosure

Relationship management in SNSs refers to users who are able to build new connections and maintain existing relationships with others^[3]. When a user is willing to disclose more personal information, it sends out desired signals and helps to establish a common group with potential friends. On the contrary, out of relationship management need, users will be more positive to disclose information. Thus, we hypothesize:

H4: Users' beliefs regarding the convenience of managing relationships is positively related to their self-disclosure in social networking sites.

Self-presentation refers that individuals intentionally manage the impression they wish to convey to others^[13]. Through presenting desirable information about themselves in SNSs, users could reveal their identity and formulate the impression they wish to produce^[14]. Driven by the desire to self-present, users make use of available functionality to showcase their achievements and experiences by sharing photos and taking part in

group in groups they deem appealing. Thus, we hypothesize:

H5: Users' belief regarding self-presentation benefits is positively related to their self-disclosure in social networking sites.

Except for the basic communication function, SNSs also offer many entertaining features, such as games, attention-grabbing articles, or videos, which encourage users to participate and disclose their personal information. Prior studies have empirically demonstrated that perceived enjoyment is an influential factor that drives users to self-disclosure^[6]. Following from this, we hypothesize:

H6: Users' enjoyment of the platform use is positively related to their self-disclosure in SNSs.

Perceived privacy risk refers to the degree to which an individual believes that a high potential for loss is associated with the release of personal information in SNSs. SNSs involve particular risks associated with the public accessibility of users' information secret sharing, collection and sharing of information by third parties, identity theft or use of the information for phishing^[15]. And users will control information disclosure according to the degree of the perception of privacy risk. Thus, we hypothesize:

H7: Users' Perceived privacy risk is negatively related to self-disclosure in social networking sites.

According to the theoretical analysis above, an integrated model shown in Figure 1 was proposed to explain the factors influencing the self-disclosure behavior in SNSs.

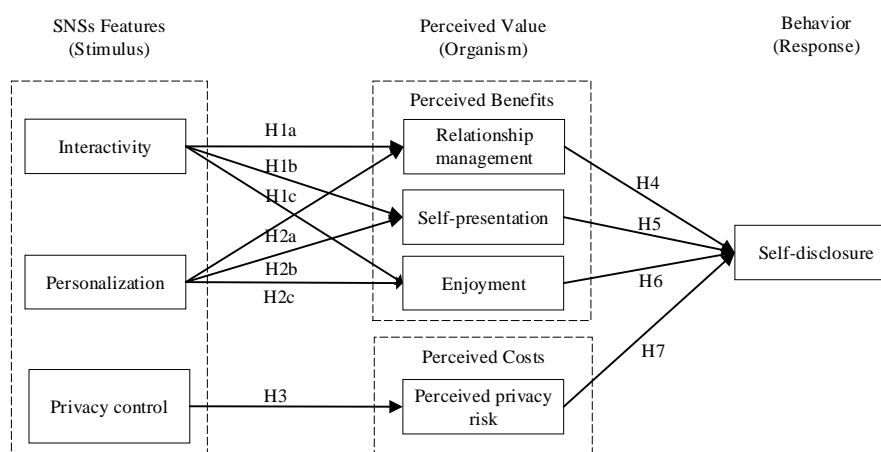


Figure 1. Research model

4. METHODOLOGY

4.1 Instrument

To ensure content validity, all measurement items were adopted from previous literature, with appropriate modifications to suit the context of this study. Each item was taken on a seven-point Likert scale with 1 = "not agree at all", 4 = "neutral", and 7 = "absolutely agree". As the respondents participating in the survey are all Chinese, the questionnaire was translated to Chinese in order to measure precisely.

4.2 Pilot study

Before the formal investigation, we performed a pilot test with 86 valid questionnaires we collected from the classmates to refine the instrument and improve its validity. Exploratory factor analysis (EFA) was conducted to test the convergent and discriminant validity of the instrument. Table 1 reports the principal component analysis results with varimax rotation using SPSS20. According to previous research, the factor loading of the item on the intended construct should be greater than 0.5 to satisfy convergent validity, and on the unintended construct should be less than 0.4 for discriminant validity. As we can see from Table 1, our

instrument has good convergent validity and discriminant validity, and can be used for formal investigation.

4.3 Data collection

An online survey was conducted to collect data from the users of a variety of SNSs in China, such as WeChat, Sina Weibo. As a result, a total of 286 responses were received, however, only 210 usable and valid ones were left. Generally, Males composed 46% of the sample, it was a little lower than female. And that most of the respondents were aged between 18 and 25 years old. Almost 96% of respondents engaged in SNSs at least one year, and 61% had the SNSs experience over than 5 years.

Table 1. Factor loading table for EFA of pilot data

Constructs	Items	Components							
		1	2	3	5	6	7	4	8
Interactivity	INT1	0.857	-0.012	0.05	0.011	-0.044	0.111	-0.139	-0.093
	INT2	0.75	0.123	0.119	0.289	0.118	0.013	0.171	0.12
	INT3	0.826	0.023	0.052	0.018	0.032	0.153	-0.112	0.021
Personality	PER1	0.307	0.62	-0.062	-0.134	-0.09	0.053	0.199	0.232
	PER2	0.056	0.769	0.082	0.126	0.087	0.052	-0.094	0.17
	PER3	-0.199	0.721	0.239	0.273	0.117	0.146	-0.162	0.083
Privacy policy	PP1	0.031	0.049	0.863	0.083	-0.151	-0.059	0.145	-0.025
	PP2	0.084	0.188	0.819	-0.084	-0.003	0.217	-0.198	0.206
	PP3	0.054	0.009	0.89	0.087	0.018	0.052	0.041	0.195
Relationship	RM1	0.061	0.363	-0.015	0.728	0.005	0.076	0.049	0.102
Management	RM2	0.155	0.197	0.139	0.768	0.1	0.077	-0.021	0.245
	RM3	0.05	-0.169	0.003	0.84	0.111	0.086	0.022	0.049
Self-presentation	SP1	0.145	0.117	-0.101	0.143	0.821	-0.049	-0.067	0.074
	SP2	0.191	-0.055	-0.047	0.263	0.75	0.228	0.264	0.17
	SP3	-0.245	0.02	-0.002	-0.089	0.678	0.175	-0.062	-0.015
Enjoyment	EN1	0.018	-0.038	0.077	0.197	0.113	0.777	-0.003	0.051
	EN2	0.05	0.351	0.007	-0.015	0.072	0.718	0.285	0.088
	EN3	0.082	0.043	0.069	0.029	0.09	0.814	0.12	0.248
Perceived privacy risks	PPR1	-0.075	-0.077	-0.065	-0.031	-0.05	-0.016	0.883	-0.024
	PPR2	0.067	-0.015	0.086	0.049	-0.027	0.07	0.889	-0.126
	PPR3	0.021	0.028	0.021	0.034	0.109	0.269	0.838	-0.091
Self-disclosure	SD1	-0.065	0.378	0.164	0.204	-0.099	-0.016	-0.058	0.714
	SD2	-0.079	0.141	0.109	0.099	0.032	0.06	-0.078	0.877
	SD3	0.028	-0.013	0.066	0.145	0.047	0.174	-0.098	0.886
	SD4	0.127	0.124	0.076	0.005	0.199	0.171	-0.038	0.779
	Eigenvalue	5.248	3.075	2.327	1.862	1.588	1.444	1.387	1.154
	Variance %	26.868	12.813	9.697	7.758	6.616	6.016	5.781	4.809
	Cumulative	26.166	34.682	44.379	52.137	58.753	64.769	70.550	75.359
	Variance %								

4.4 Data analysis and results

4.4.1 Reliability and validity testing

In order to ensure the quality of the scales, we performed confirmatory factor analysis(CFA) to assess the reliability and validity. CFA is the conventional statistical method used to test reliability and validity for the measurement model. For construct reliability, composite factor reliability (CFR) and Cronbach's alpha (α) are two key indicators. Generally, the constructs have good reliability if CFR and α are greater than 0.7, which are

satisfied according to table 2, suggesting a good reliability in our study.

To ensure sufficient convergent validity, the average variance extracted (AVE) by the latent factor should be greater than 0.5, that is, a construct should explain more than 50% of the item variance. In addition, the standard loadings should be greater than 0.7. Table 2 shows that AVE and standard loading values were higher than the suggested thresholds. Therefore, the constructs have good convergent validity.

Discriminant validity is the degree to which the measurement of a variable is not a reflection of other variables. To ensure sufficient discriminant validity, the square root of AVE for any latent variable should be higher than the correlations between that latent variable and other latent variables. The data shown in Table 3 satisfies this requirement, indicating that each reflective construct is more strongly related to its own measures than to the rest of the constructs, thus demonstrating discriminant validity.

Table 2. The convergent validity of the measurement model

Construct	Item	Standard Loading	T value	AVE	CFR	α	Construct	Item	Standard Loading	T value	AVE	CFR	α
Interactivity	INT1	.867	13.7	0.76	0.90	0.90	Self- presentation	SP1	.844	11.9	0.66	0.85	0.83
	INT2	.819	14.1					SP2	.787	12.8			
	INT3	.934	20.8					SP3	.807	13.3			
Personality	PER1	.716	7.80	0.53	0.77	0.71	Enjoyment	EN1	.805	10.7	0.60	0.82	0.81
	PER2	.784	11.9					EN2	.723	12.9			
	PER3	.697	11.5					EN3	.802	13.4			
Privacy control	PC1	.859	13.9	0.74	0.89	0.88	Perceived privacy risk	PPR1	.891	14.0	0.78	0.91	0.89
	PC2	.863	16.6					PPR2	.895	15.4			
	PC3	.870	12.7					PPR3	.867	14.9			
Relationship management	RM1	.761	9.16	0.52	0.76	0.70	Self- disclosure	SD1	.723	13.0	0.62	0.87	0.86
	RM2	.769	11.5					SD2	.785	13.9			
	RM3	.639	8.17					SD3	.867	13.3			
								SD4	.784	12.1			

Table 3. Descriptive statistics and factor correlation

	Mean	SD	INT	PER	PP	RM	SP	EN	PPR	SD
INT	5.75	1.16	0.87							
PER	4.71	1.54	0.26	0.73						
PC	4.61	1.61	0.15	0.53	0.86					
RM	5.25	1.22	0.33	0.46	0.24	0.72				
SP	5.39	1.18	0.35	0.37	0.2	0.23	0.81			
EN	5.38	1.30	0.33	0.53	0.28	0.29	0.25	0.78		
PPR	5.64	1.28	-0.03	-0.09	-0.17	-0.04	-0.03	-0.05	0.88	
SD	4.51	1.62	0.27	0.4	0.24	0.44	0.26	0.51	-0.25	0.79

4.4.2 Hypotheses testing

Because our measurement model was satisfactory, we proceeded to hypothesis testing. Using LISREL 8, we created a structural equation model to specify both item-construct correspondence and construct-construct causal relationship. The results summarized in Figure 2.

Before testing the hypotheses, we must ensure that the model must fit the data well. There were a few model fitting indices to be employed here, including Chi-square/degree of freedom($\chi^2/df \leq 3$), goodness of

fit index ($GFI \geq 0.90$), normed fit index ($NFI \geq 0.90$), comparative fit index ($CFI \geq 0.90$), and root mean square error of approximation ($RMSEA \leq 0.08$), non-normed fit index ($NNFI \geq 0.90$). According to Figure 2, our results indicated satisfactory model fit.

The results shown in Figure 2 indicate that all our hypotheses were supported except the effects of self-presentation on self-disclosure (H5). Both of perceived interactivity and perceived personalization have positive impacts on perceived benefits (relationship management, self-presentation and enjoyment), while privacy control has a negative impact on perceived privacy risk, thus hypotheses H1a-H1c, H2a-H2c and H3 are supported. Meanwhile, perceived benefits (relationship management and enjoyment) have positive and significant impacts on self-disclosure, and perceived privacy risk also has a negative impact on self-disclosure, thus, H4, H6 and H7 are supported.

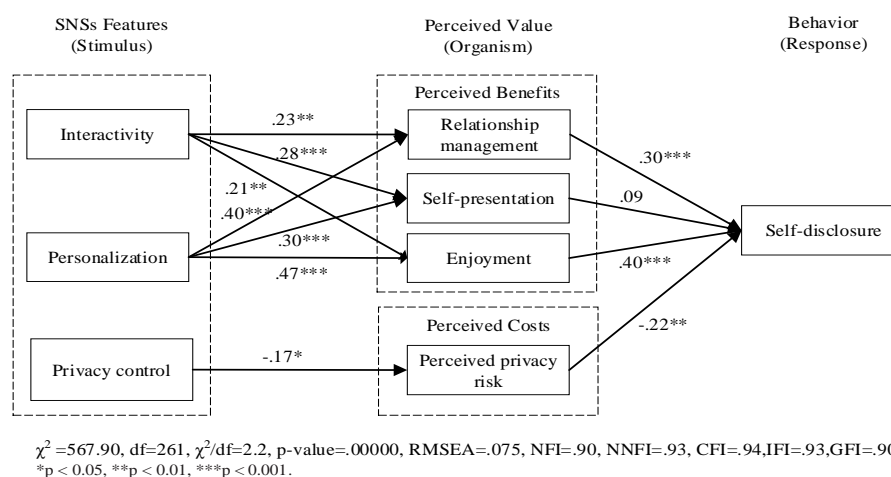


Figure 2. Empirical results

5. DISCUSSION

5.1 Discussion of findings

In summary, ten out of eleven hypotheses are supported. The results show that it is feasible to use the S-O-R paradigm to explain the self-disclosure behavior in SNSs, and the features of SNSs significantly influence their perceived value, and in turn users' cost-benefit tradeoff influence their self-disclosure behavior. On the one hand, the technical features, including interactivity, personalization and privacy control, are proved to have an indirect influence on self-disclosure. In other words, the technical features could stimulate users' internal states and affect users' behaviors. On the other hand, this study also replicates previous research of using privacy calculus to explain self-disclosure. However, we did not find support for a positive relationship between self-presentation and self-disclosure. One plausible explanation is that users will only want to present in breadth and depth their positive side and refrain from presenting their negative side in order to project a good image, which means that users may in fact withhold information or only selectively release certain information^[16]. If this is the case, self-presentation may be unrelated to self-disclosure.

5.2 Implications

This study has both theoretical and practical significance. First, this study extends the applicability of the S-O-R paradigm to the context of SNSs, which offers a new perspective to the research on the influencing factors of self-disclosure in SNSs. Second, the SNSs features are proved to be important influencing factors of self-disclosure in SNSs, which extends the scope of influencing factors of self-disclosure. Third, in the light of

the importance of SNSs features, service providers are suggested to increase interactivity and personalization by allowing real-time and less-restrained interactions, and also improve users' virtual experiences to provide more enjoyable socializing interactions. In addition, the privacy control function should be well established and enforced.

5.3 Limitations

There are some limitations in this study, which provide opportunities for further research. First, there are still some other stimulus factors that may affect users' self-disclosure behavior which are not contained in the integrated model, such as awards, social support, culture. Second, as the sample we collected in this study is from China's SNSs, the results may not be applicable universally. So, further verification in different contexts of SNSs, such as Facebook, Twitter, is needed in the future.

6. CONCLUSIONS

This study applied the S-O-R paradigm in the context of SNSs and developed an integrated model combined with the privacy calculus model to explore whether SNSs features influence users' self-disclosure. The results show that SNSs features play a crucial role in stimulating self-disclosure behavior and suggest that SNSs service providers should increase interactivity, provide personalization experience and enforce privacy protection to enhance the users' self-disclosure, and in turn, to improve the development of SNSs.

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